



FIG. 1

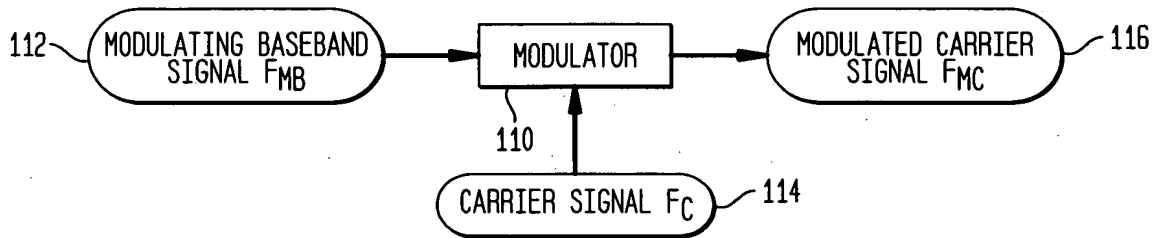


FIG. 2

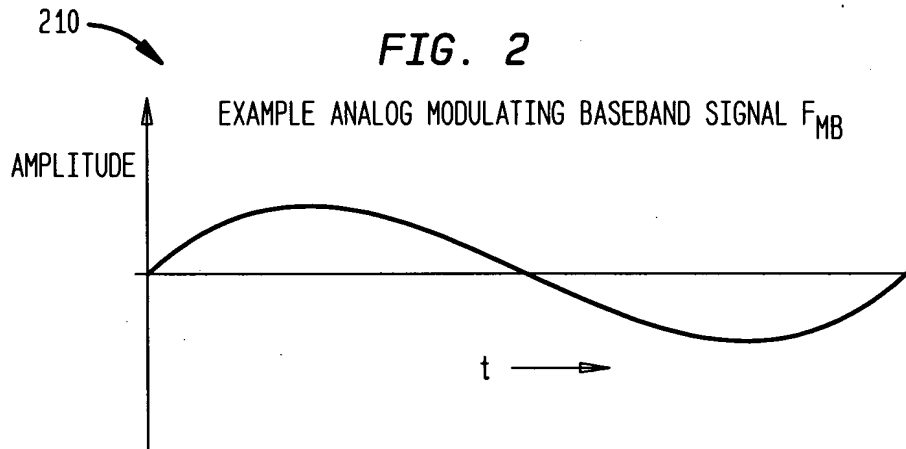


FIG. 3

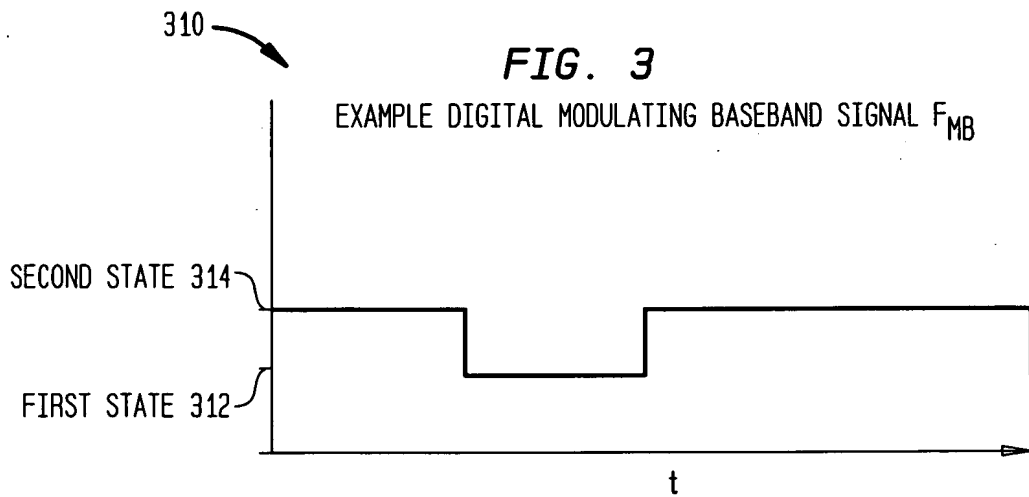
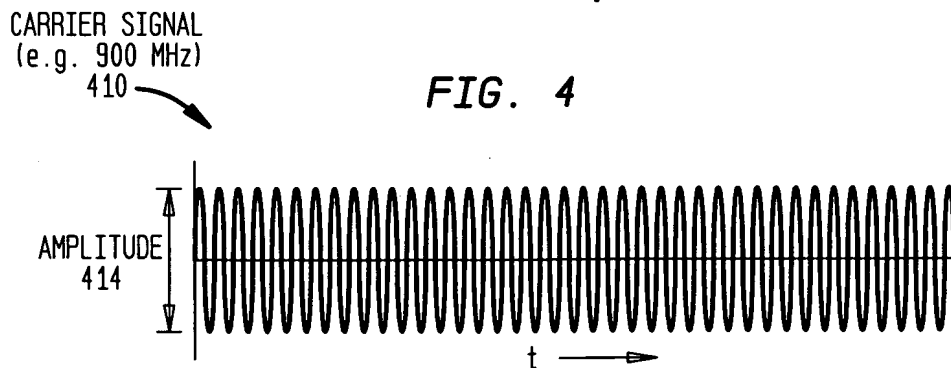
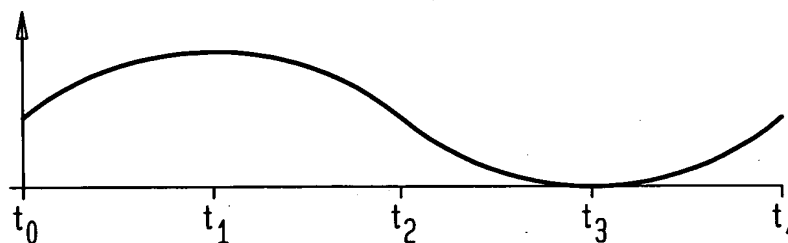


FIG. 4



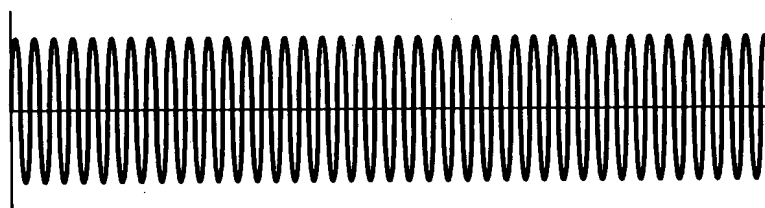
ANALOG  
BASEBAND SIGNAL  
210

FIG. 5A



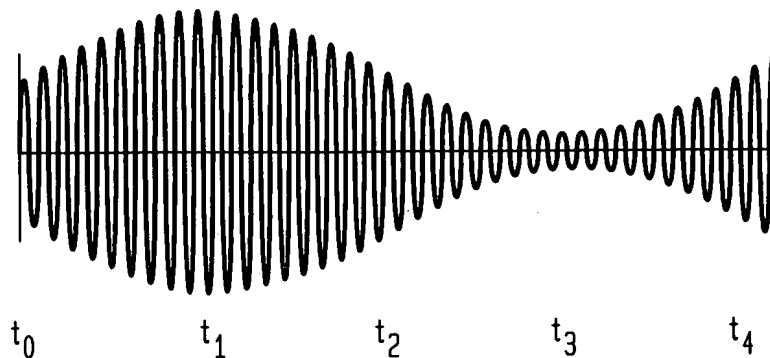
CARRIER SIGNAL  
410

FIG. 5B



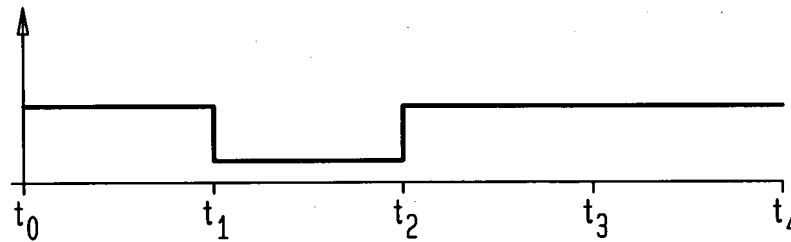
AM CARRIER  
SIGNAL  
516

FIG. 5C



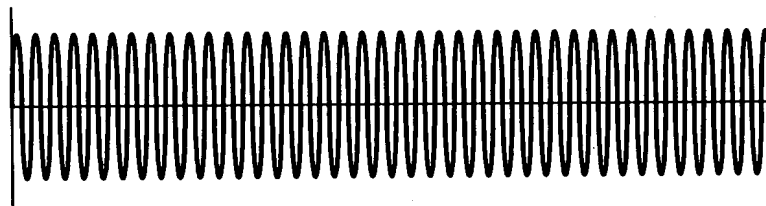
DIGITAL  
BASEBAND SIGNAL  
310

FIG. 6A



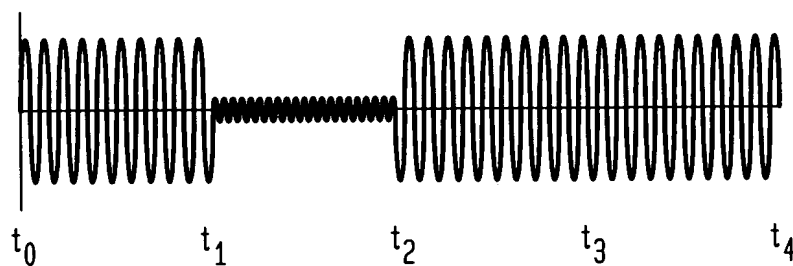
CARRIER SIGNAL  
410

FIG. 6B



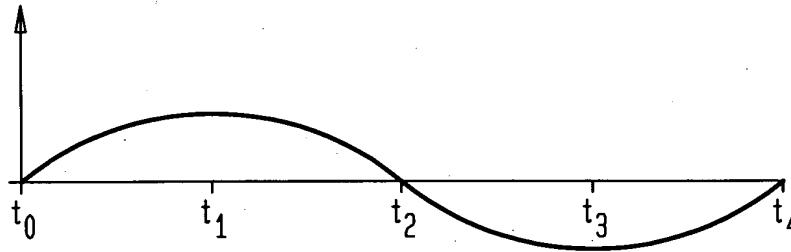
AM CARRIER SIGNAL  
616

FIG. 6C



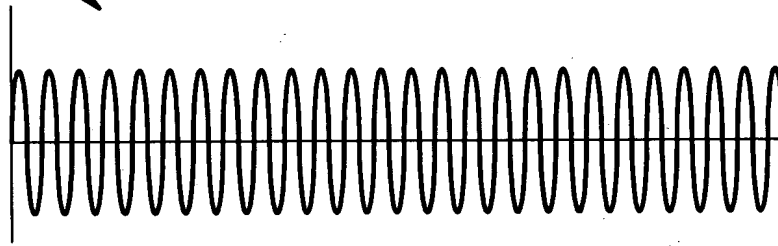
ANALOG  
BASEBAND SIGNAL  
210

FIG. 7A



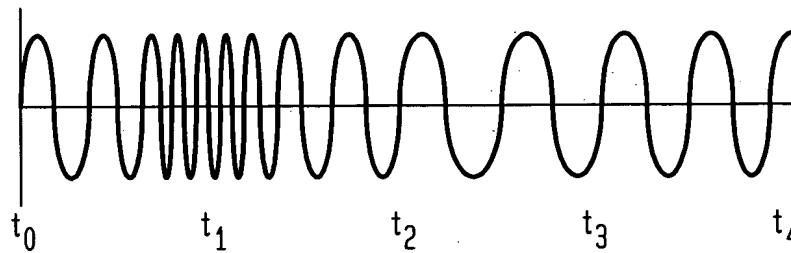
CARRIER SIGNAL  
410

FIG. 7B



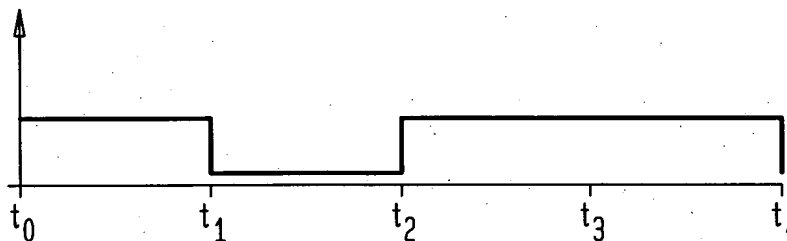
FM CARRIER SIGNAL  
716

FIG. 7C



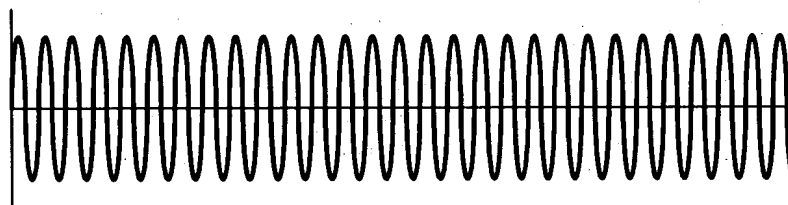
DIGITAL  
BASEBAND SIGNAL  
310

*FIG. 8A*



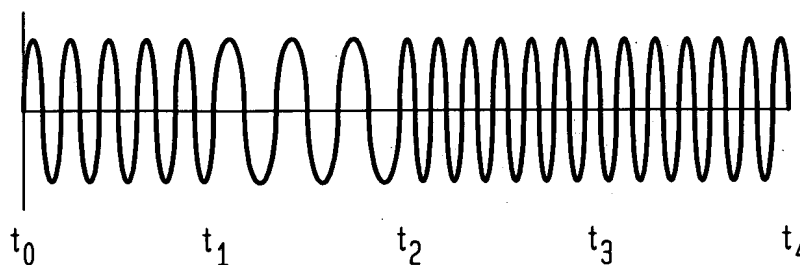
CARRIER SIGNAL  
410

*FIG. 8B*



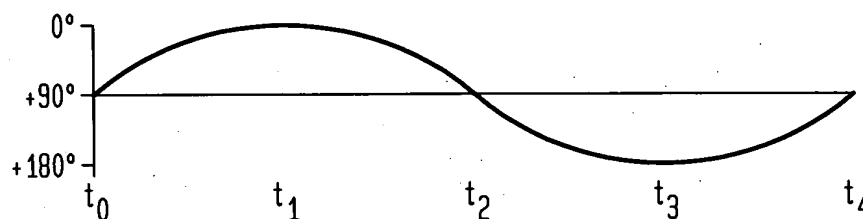
FM CARRIER SIGNAL  
816

*FIG. 8C*



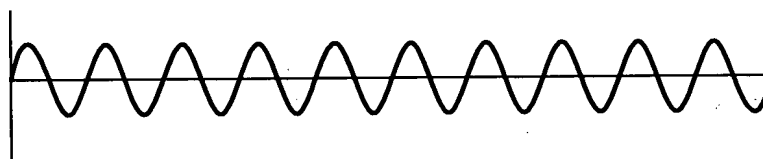
ANALOG  
BASEBAND SIGNAL  
210

FIG. 9A



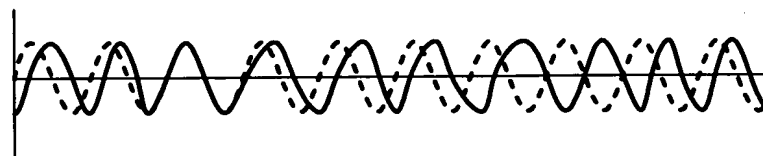
CARRIER SIGNAL  
410

FIG. 9B



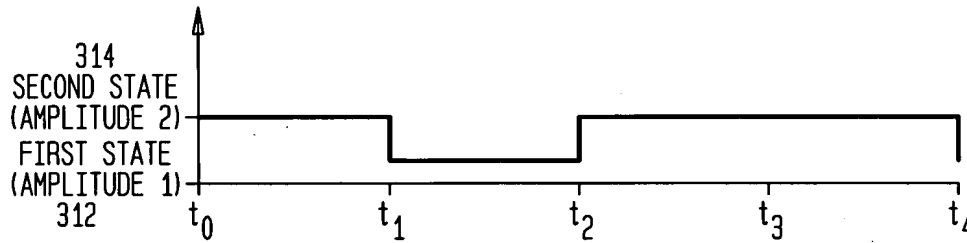
PHASE MODULATED  
CARRIER SIGNAL  
916

FIG. 9C



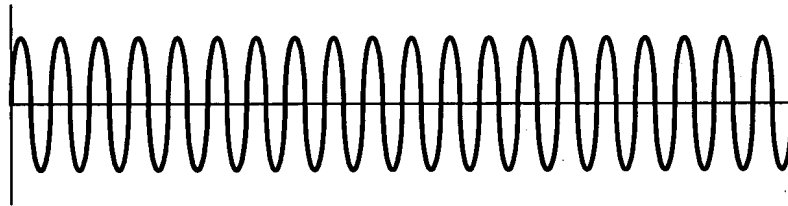
DIGITAL  
BASEBAND SIGNAL  
310

FIG. 10A



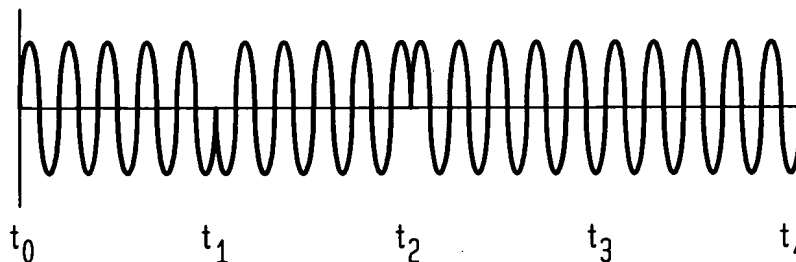
CARRIER SIGNAL  
410

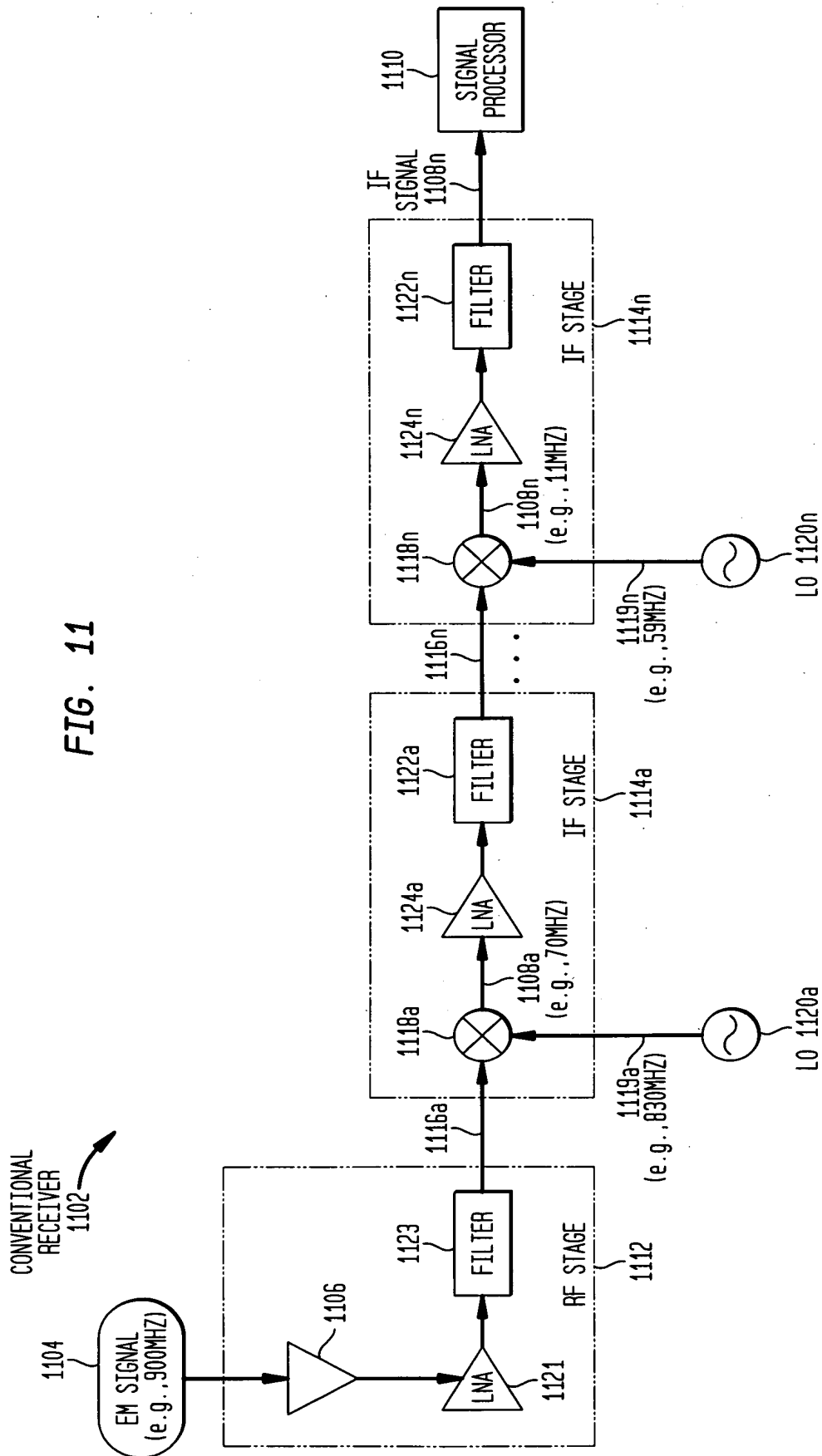
FIG. 10B



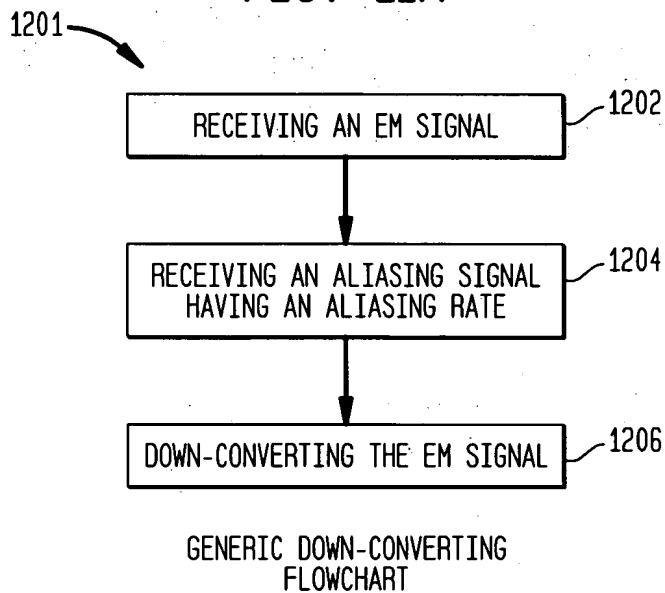
PHASE MODULATED  
CARRIER SIGNAL  
1016

FIG. 10C

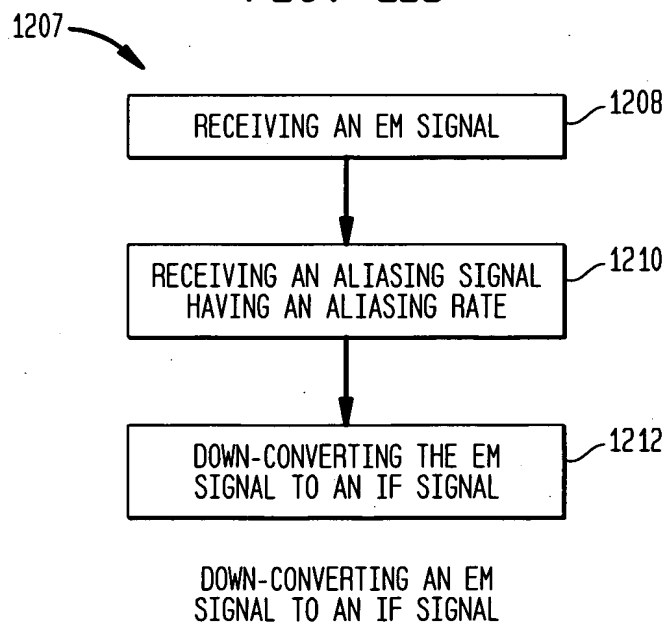




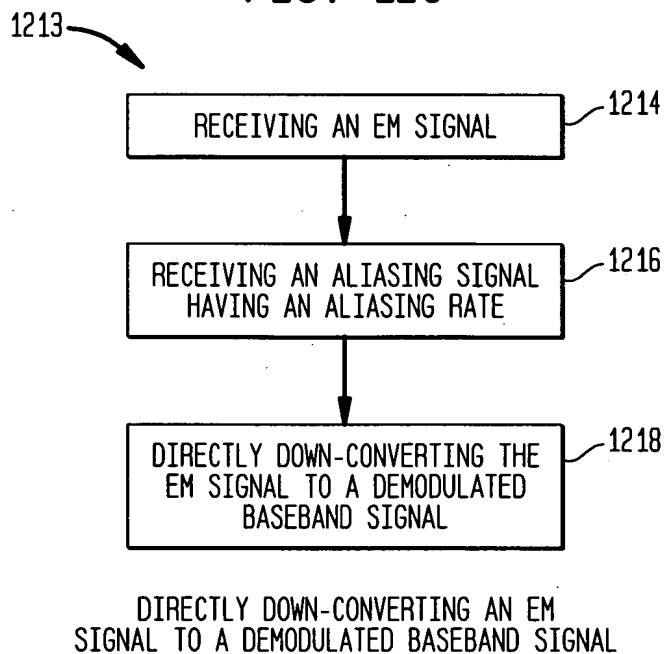
**FIG. 12A**



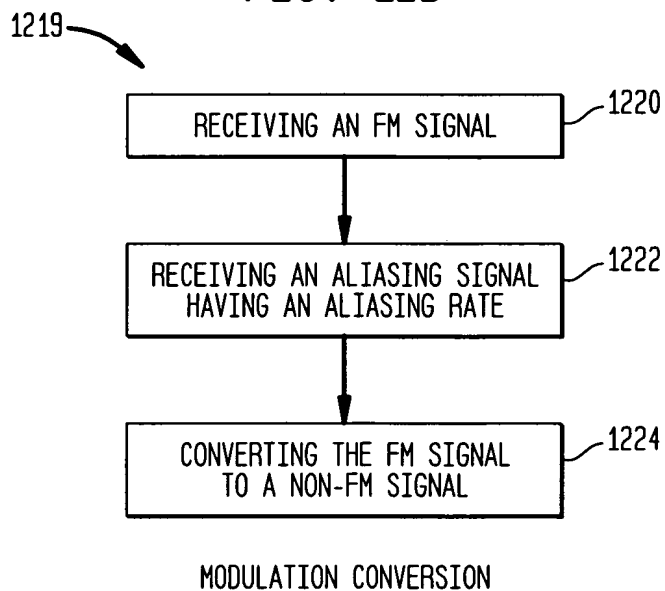
**FIG. 12B**

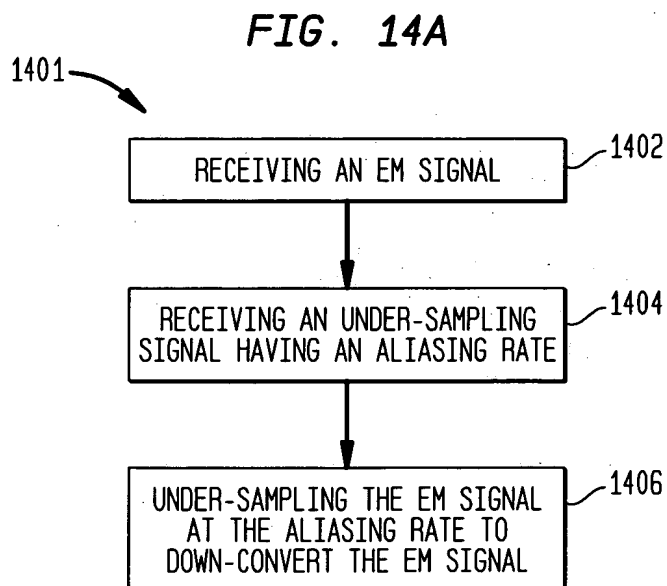
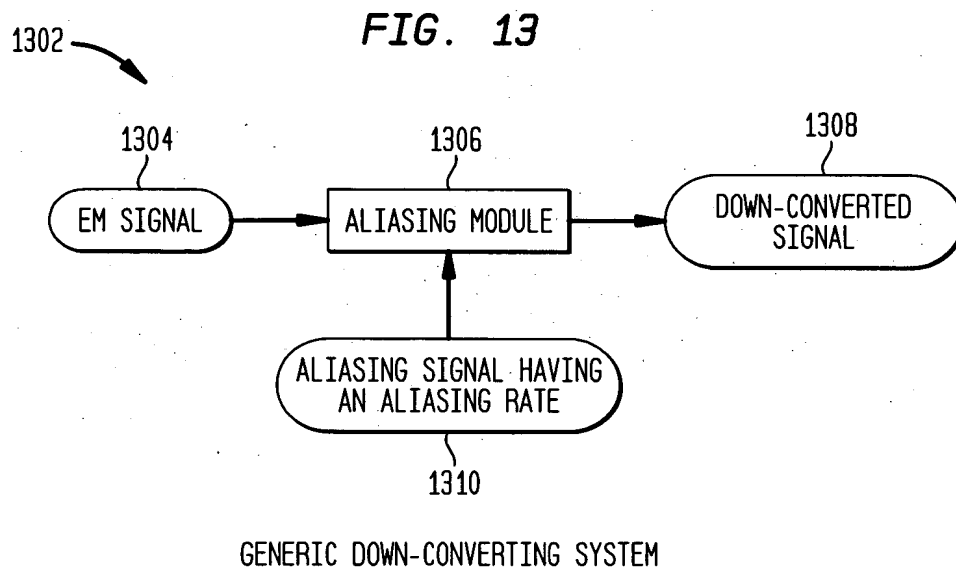


**FIG. 12C**

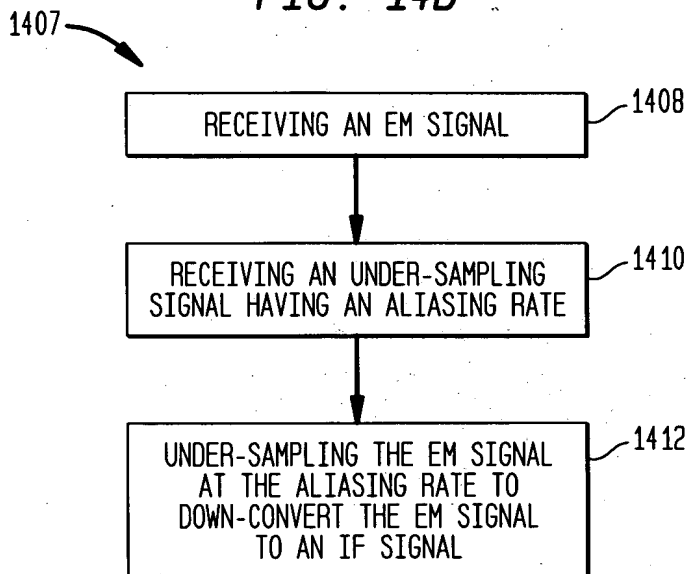


**FIG. 12D**

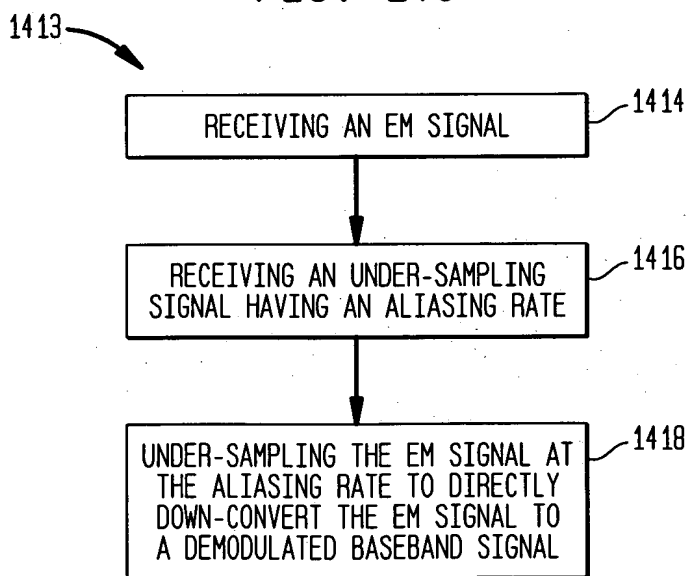




**FIG. 14B**



**FIG. 14C**



**FIG. 14D**

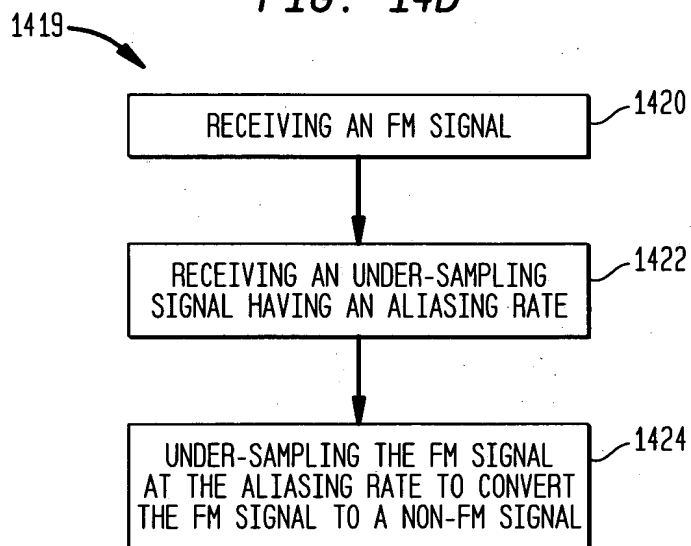


FIG. 15E

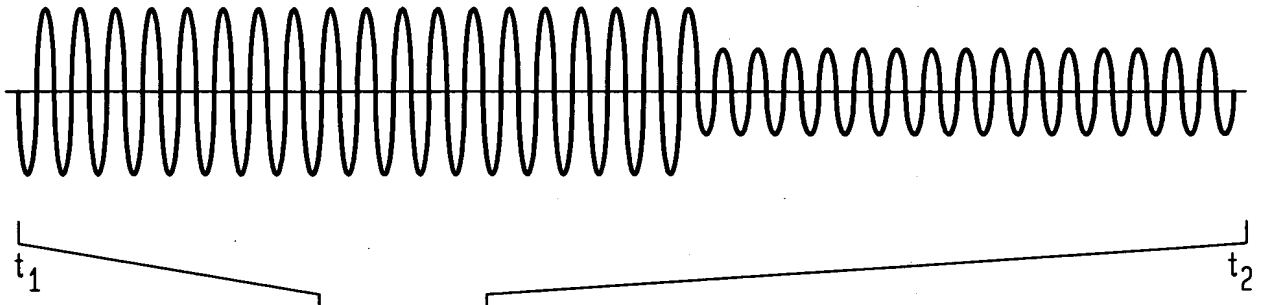


FIG. 15A

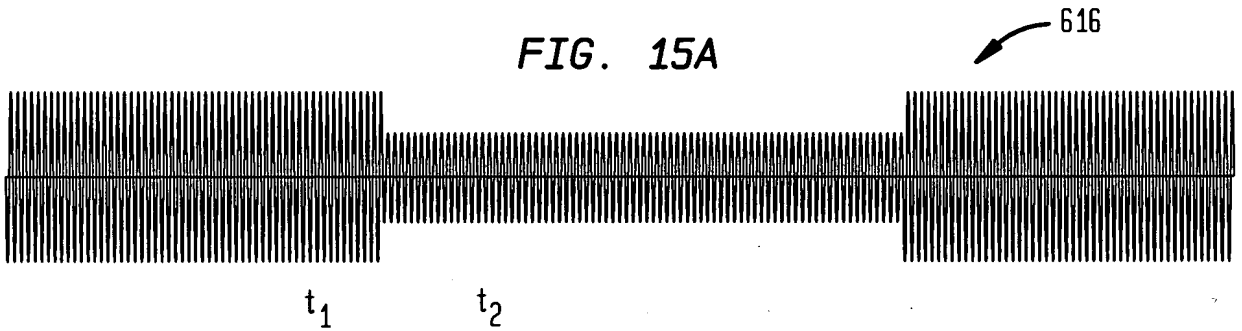


FIG. 15B

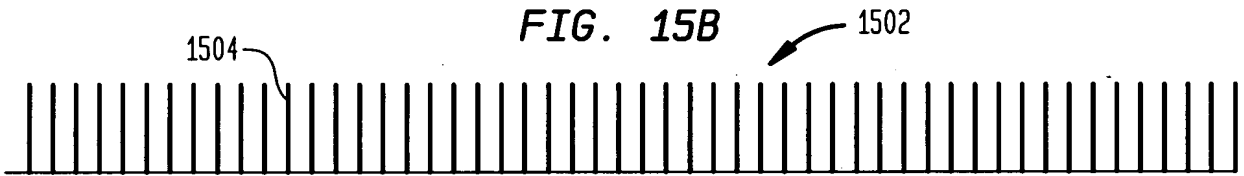


FIG. 15C

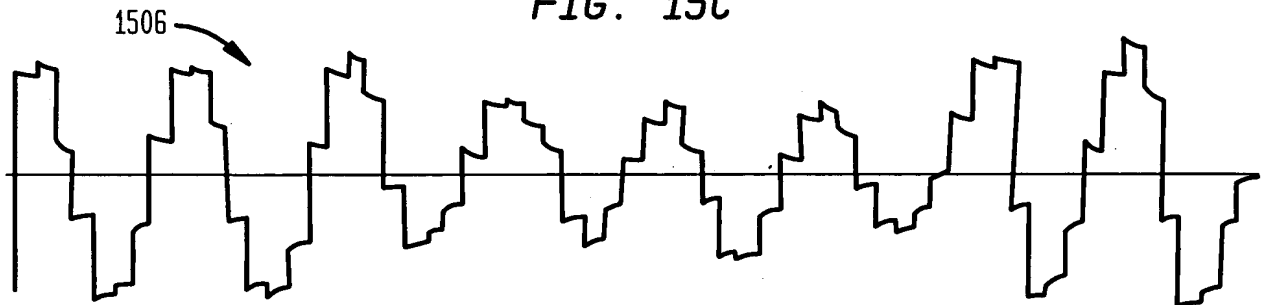
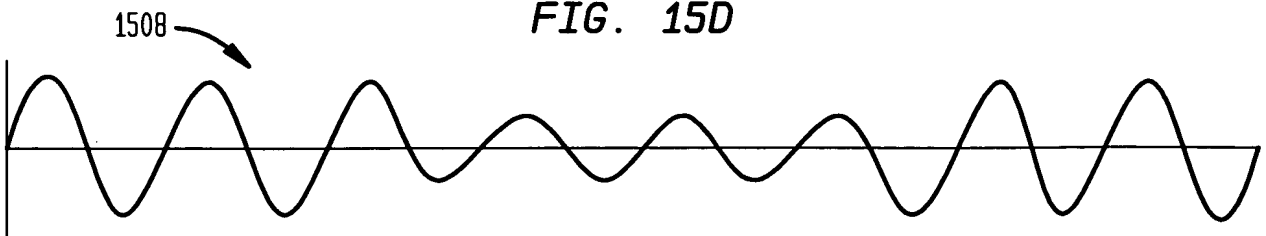
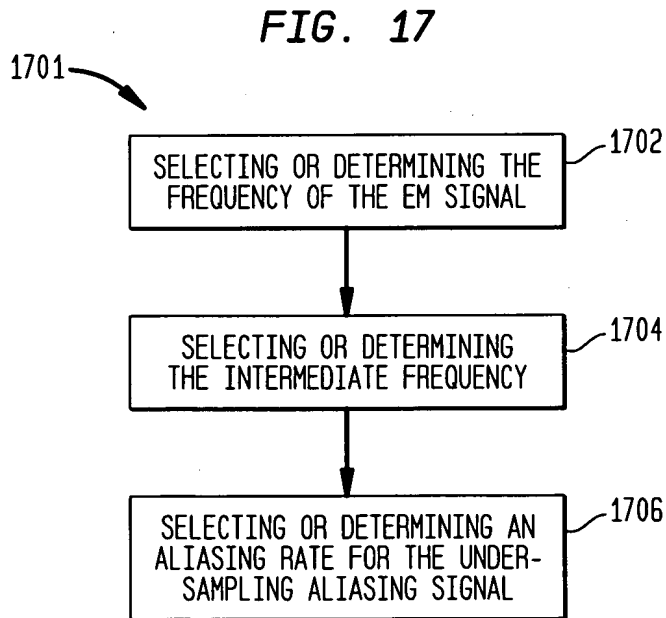
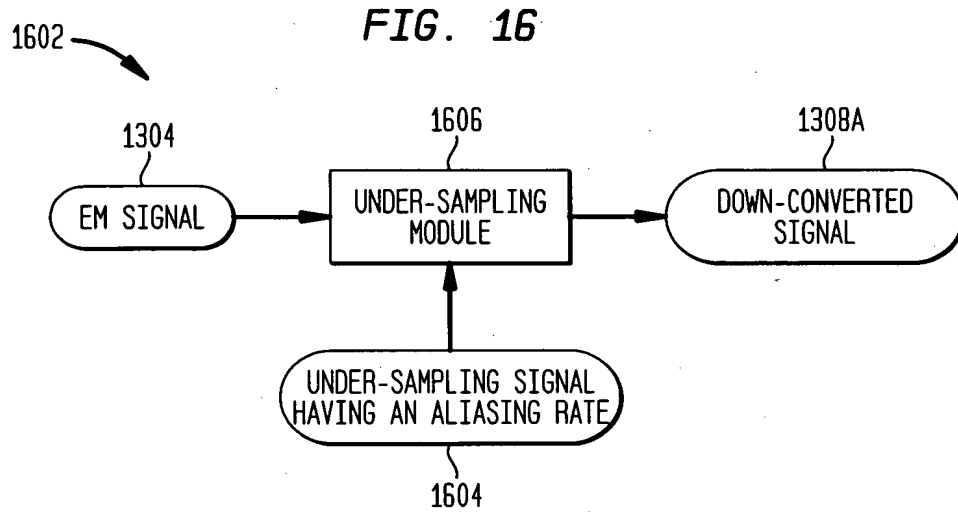


FIG. 15D





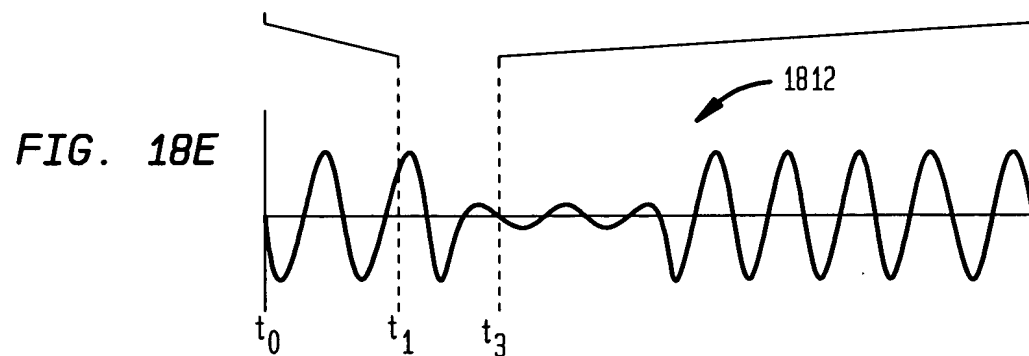
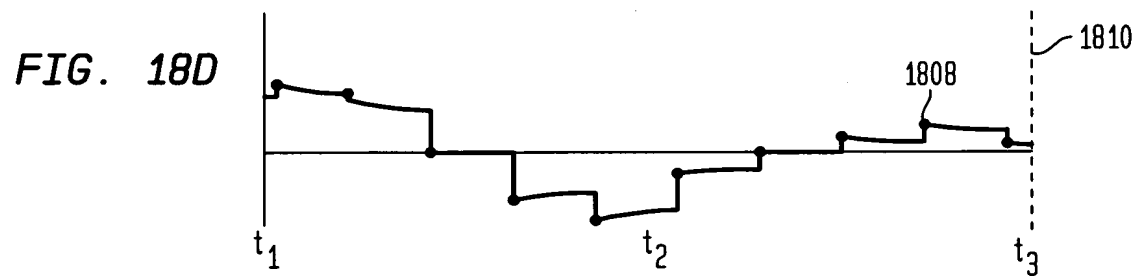
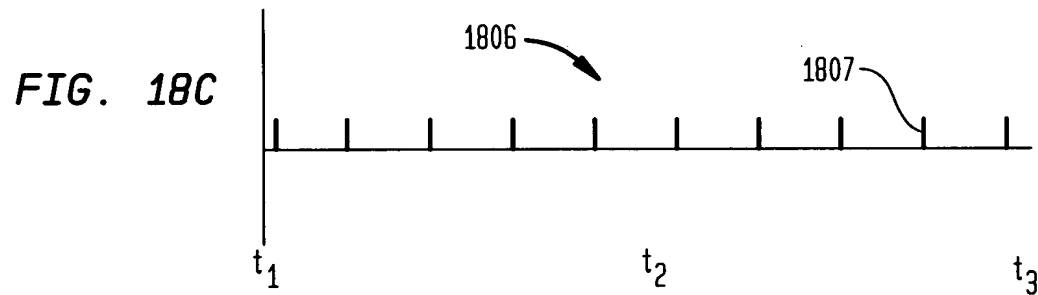
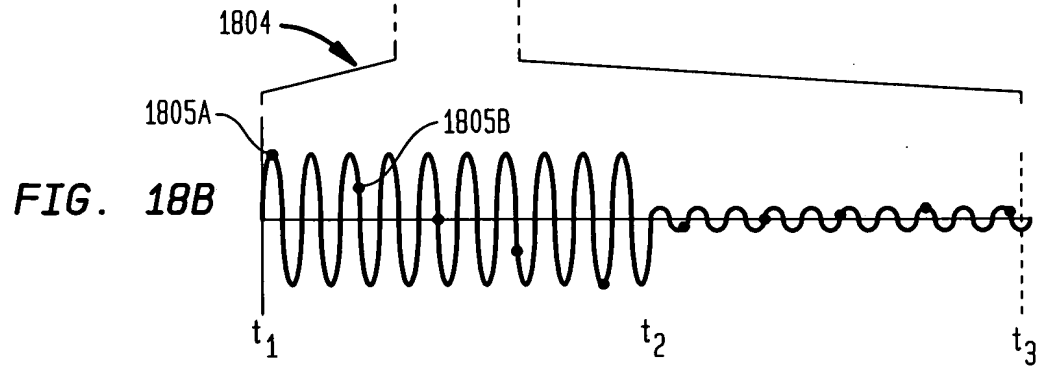
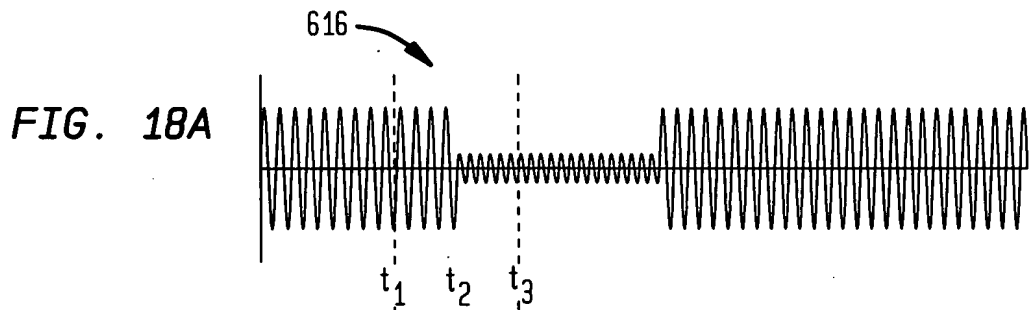


FIG. 19A

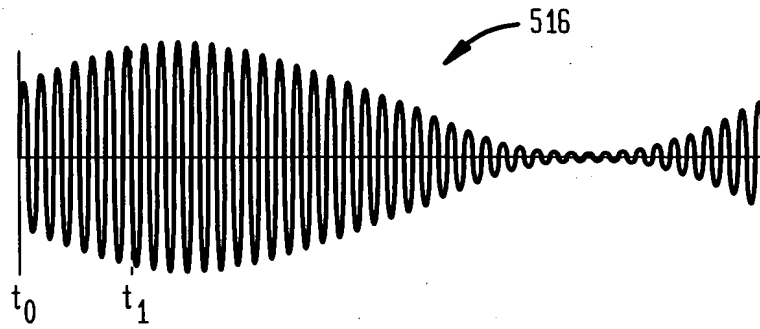


FIG. 19B

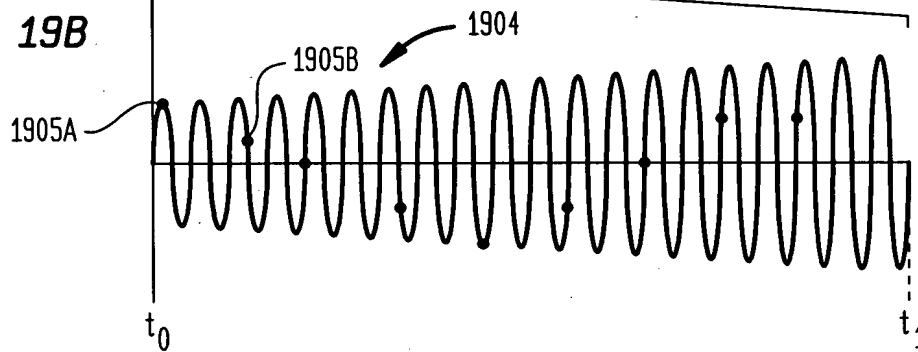


FIG. 19C

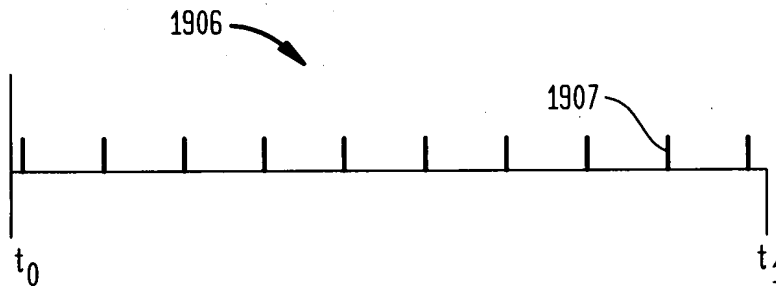


FIG. 19D

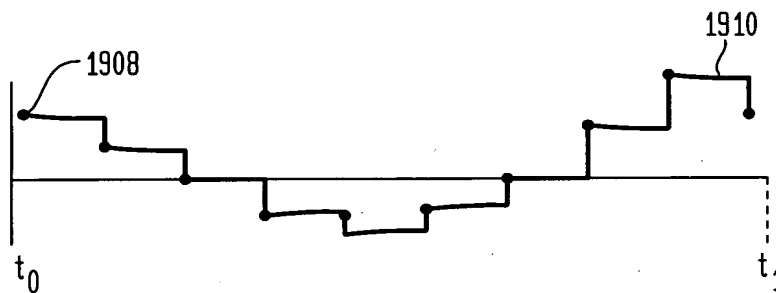
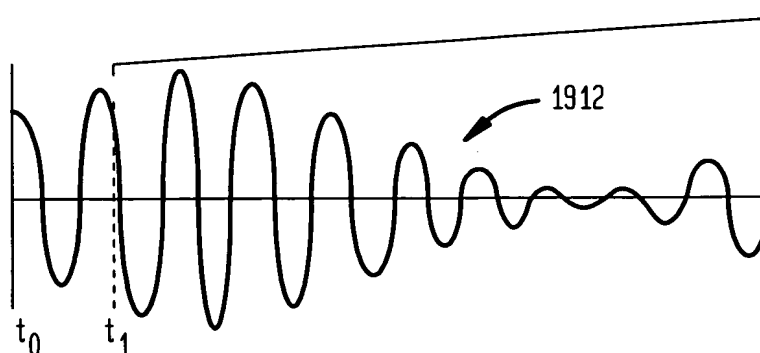
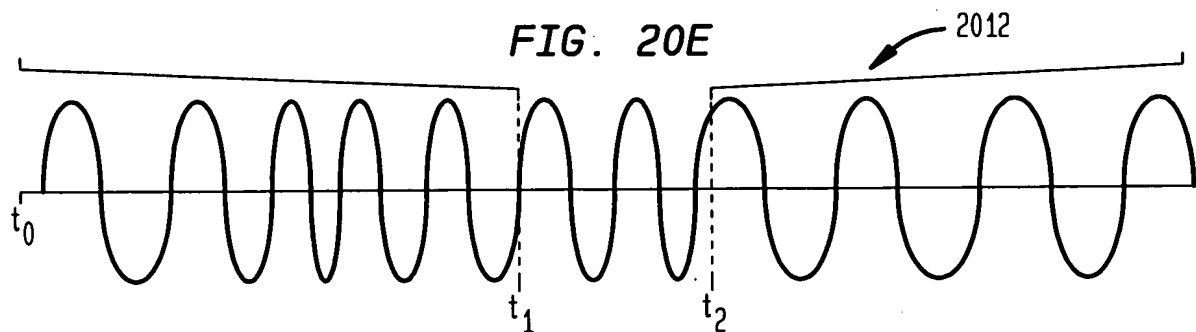
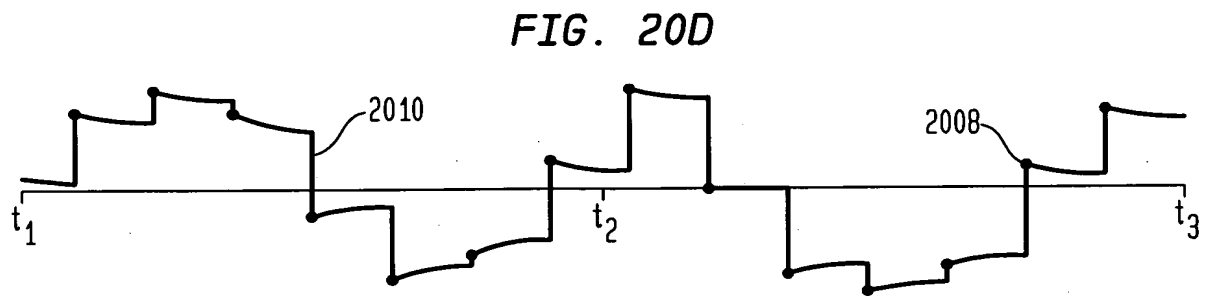
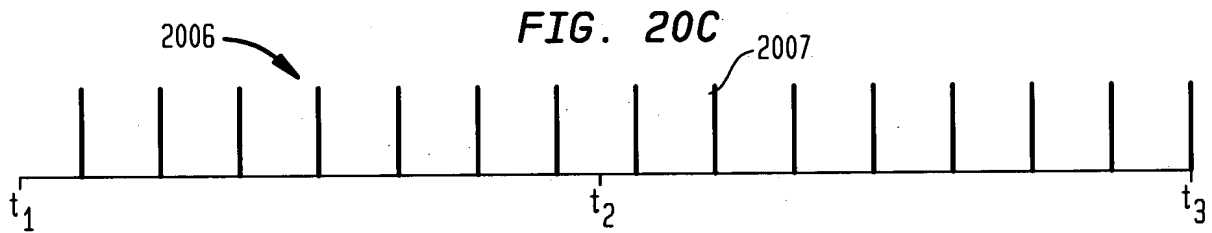
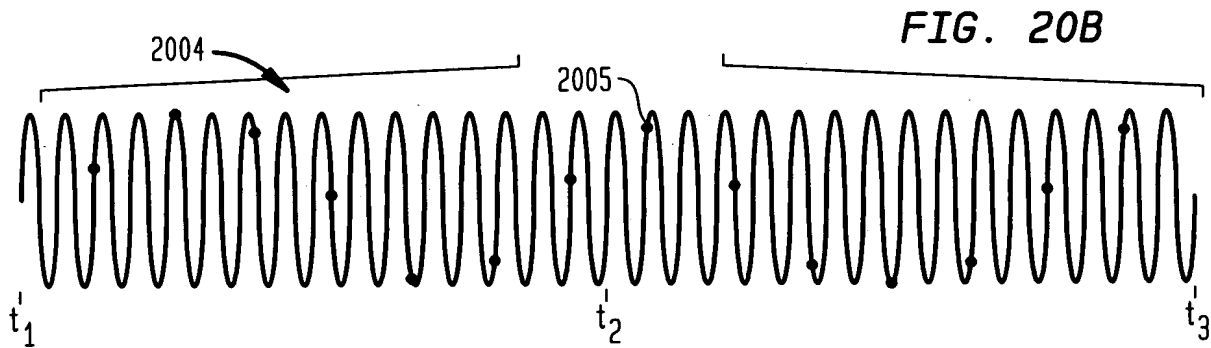
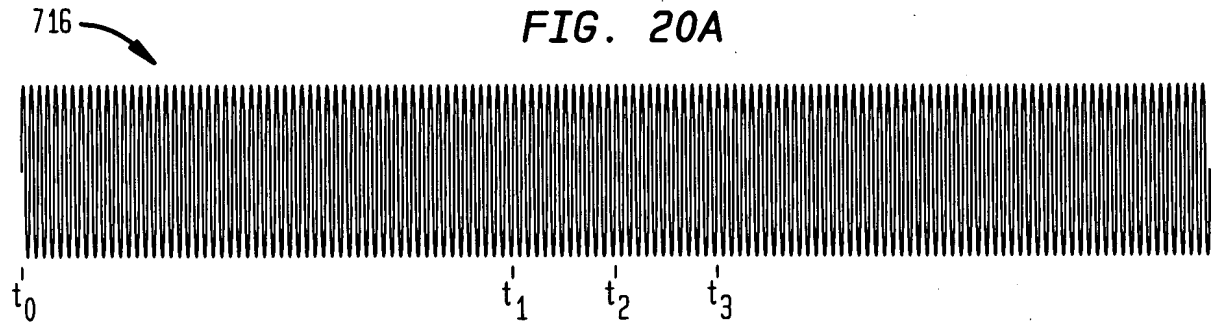
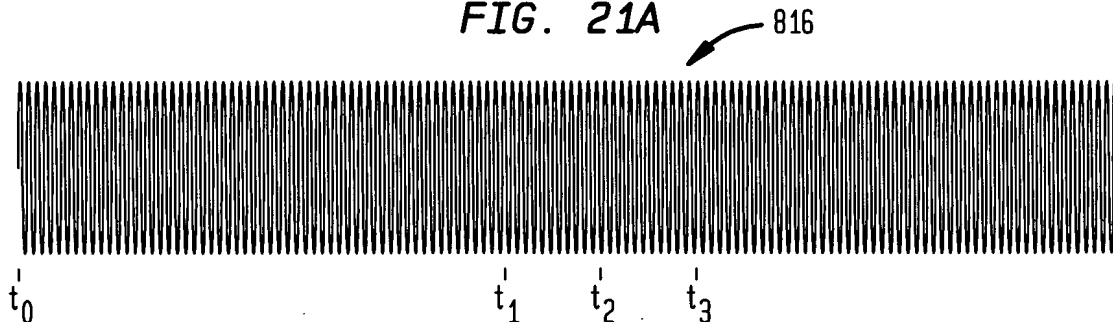


FIG. 19E

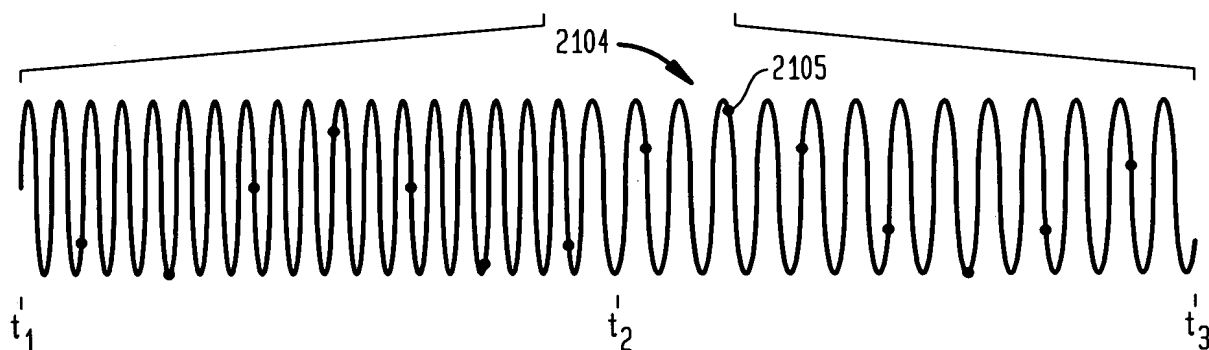




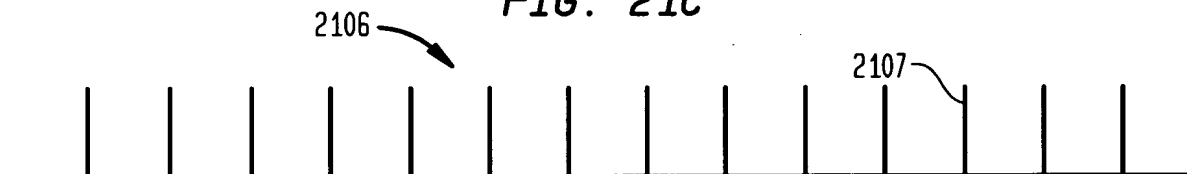
**FIG. 21A**



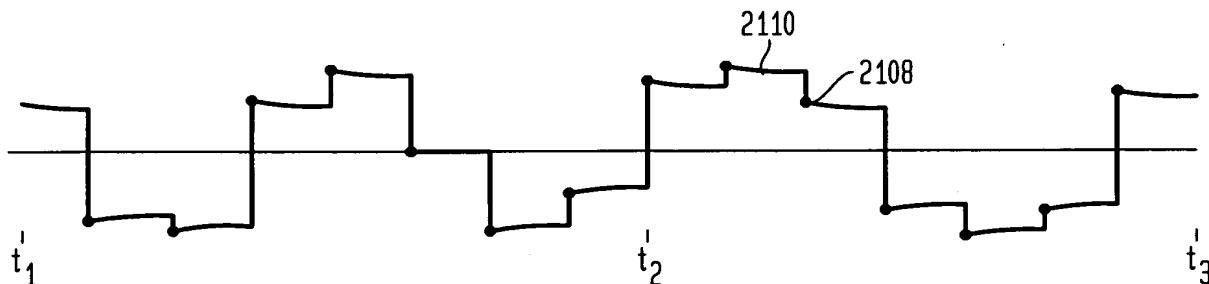
**FIG. 21B**



**FIG. 21C**



**FIG. 21D**



**FIG. 21E**

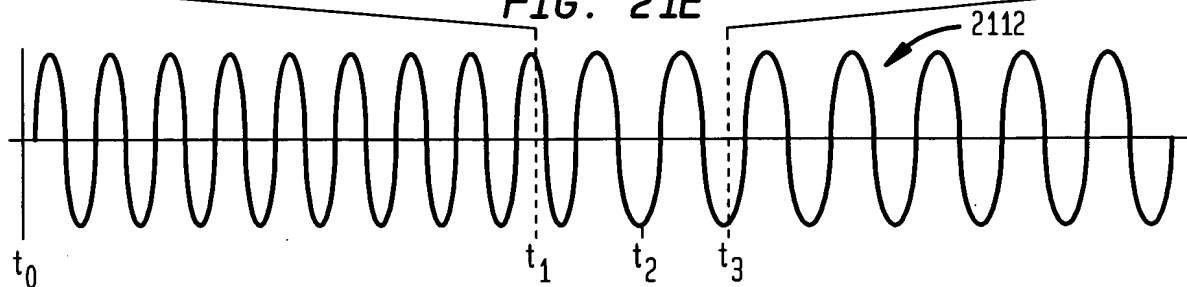


FIG. 22A

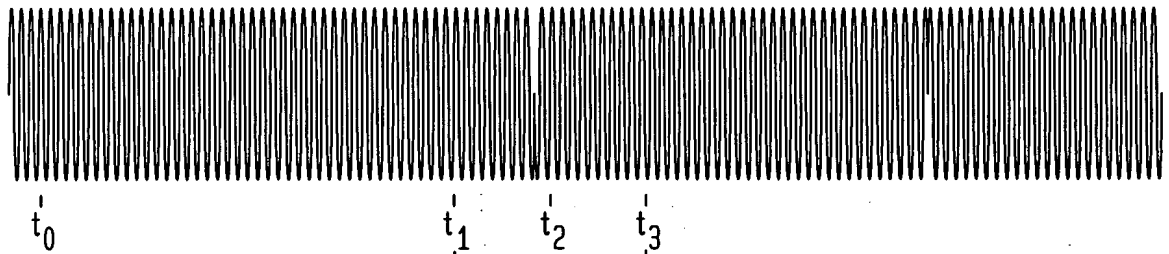


FIG. 22B

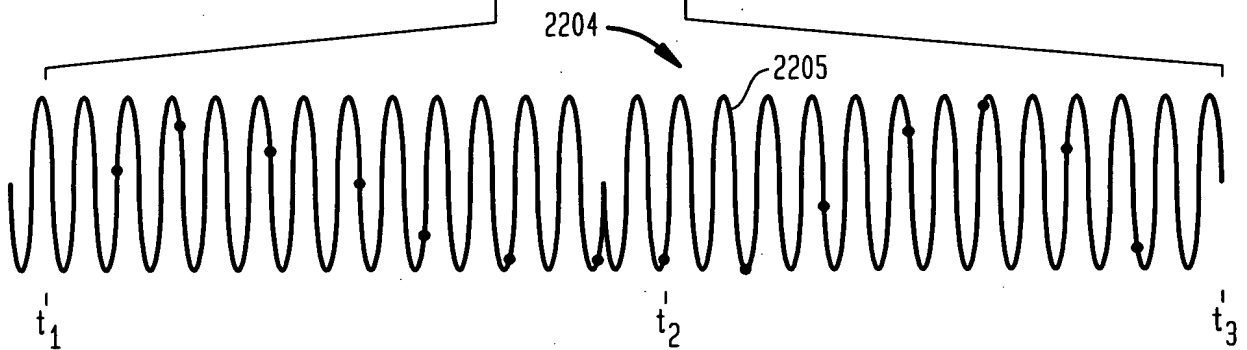


FIG. 22C

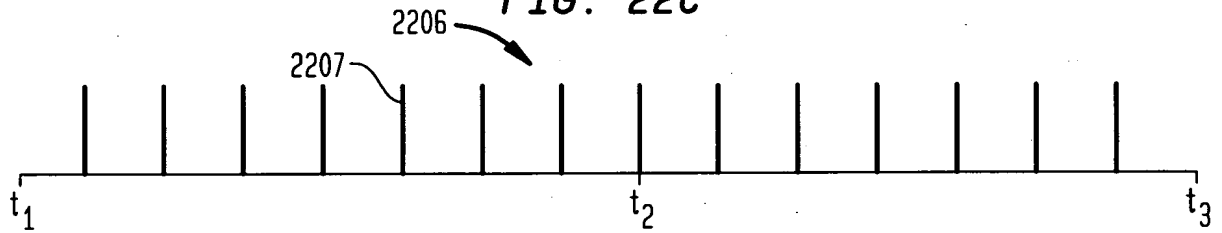


FIG. 22D

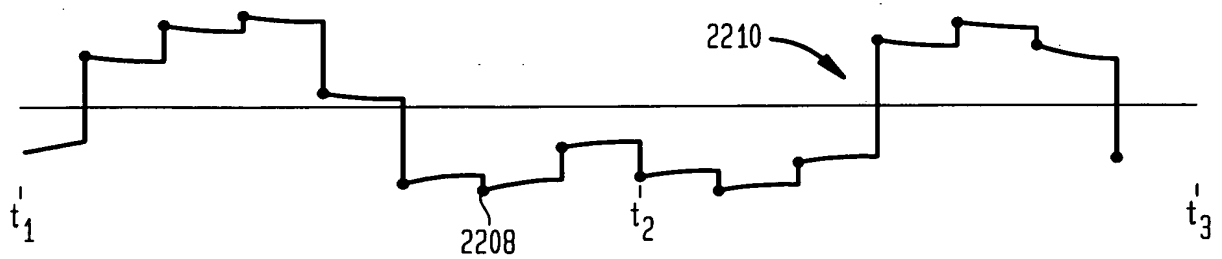


FIG. 22E

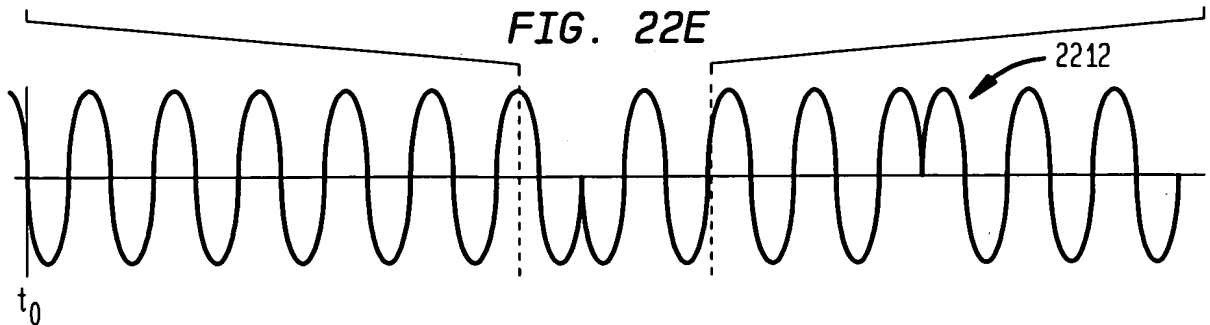


FIG. 23A

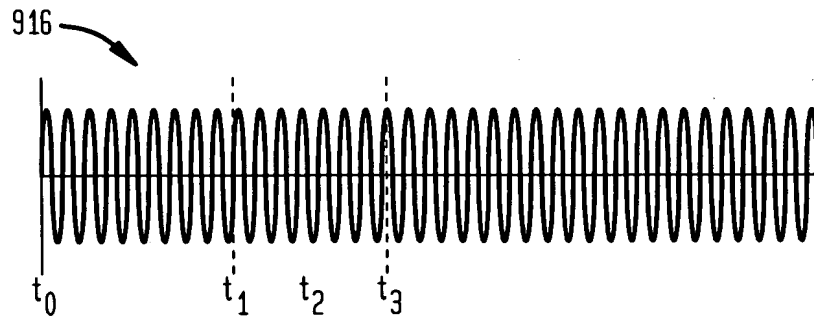


FIG. 23B

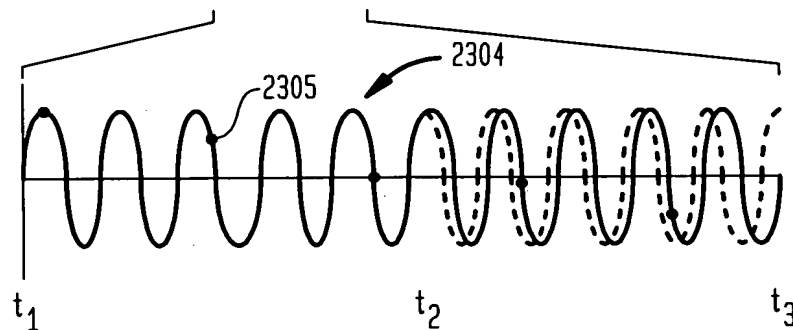


FIG. 23C

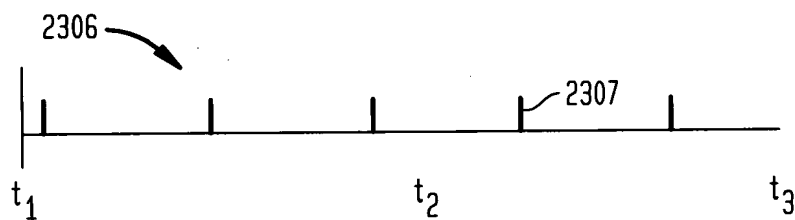


FIG. 23D

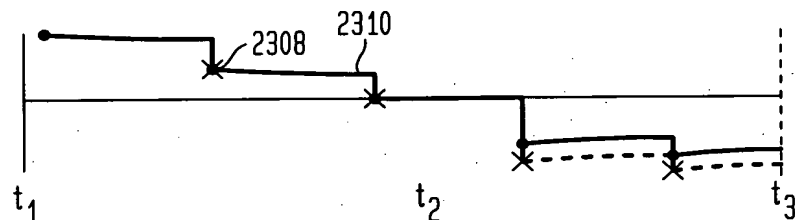
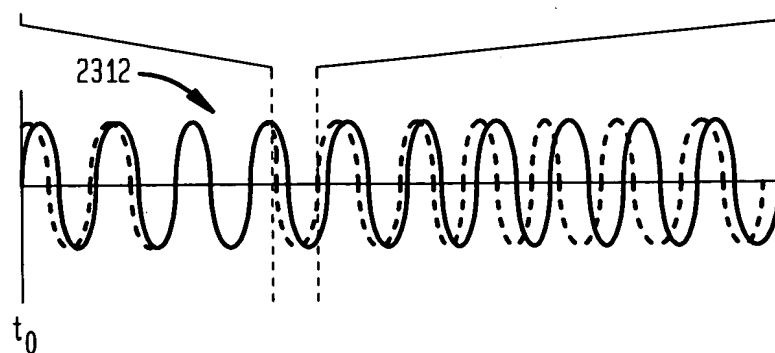
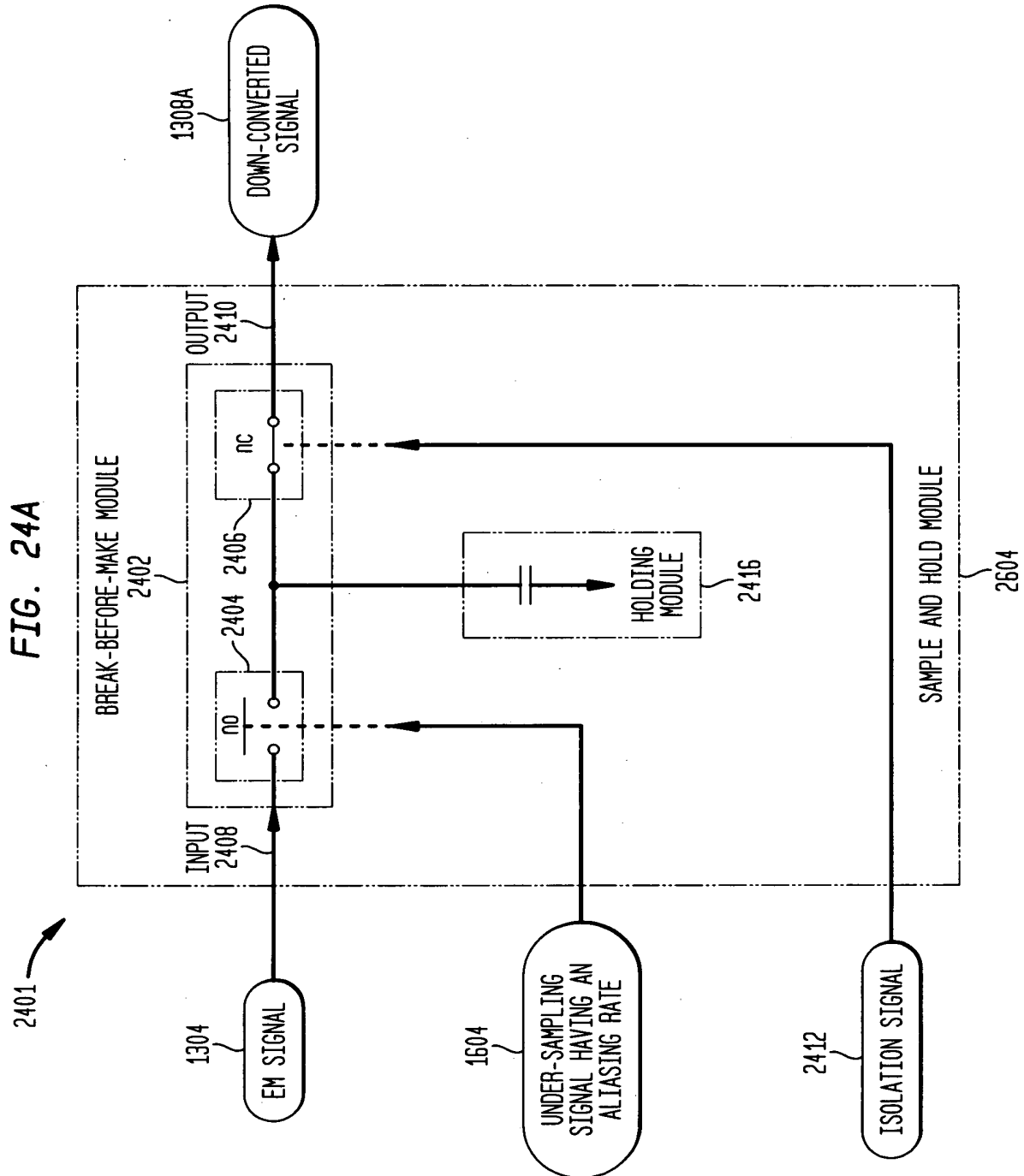
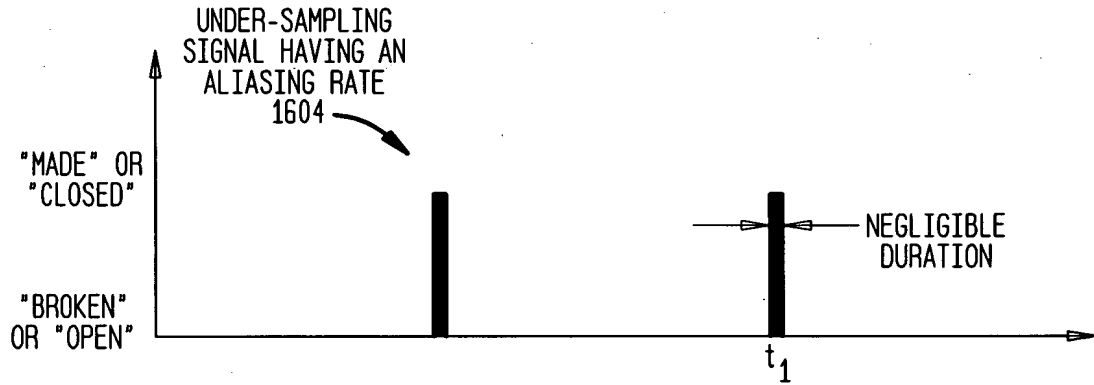


FIG. 23E

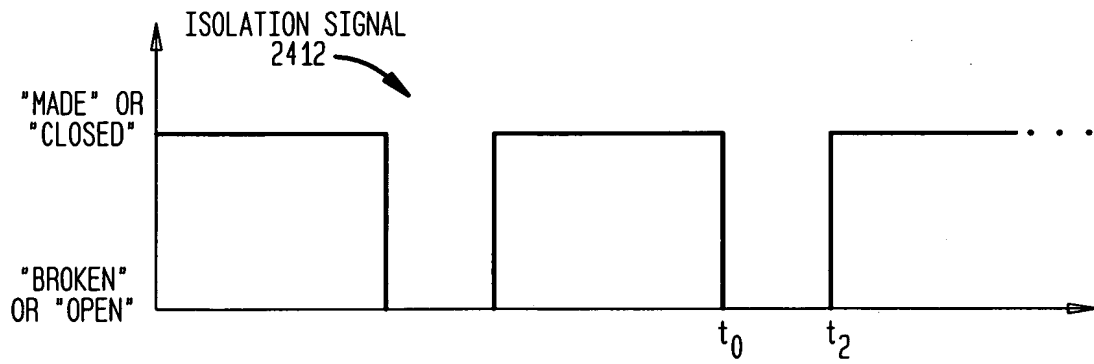


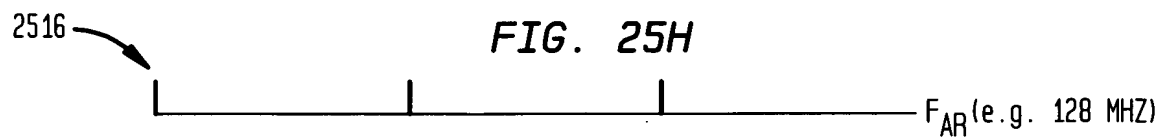
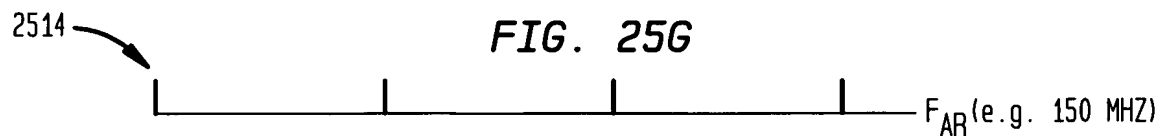
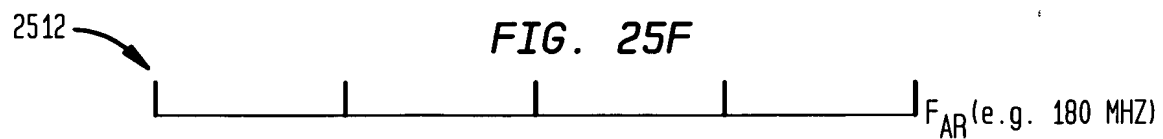
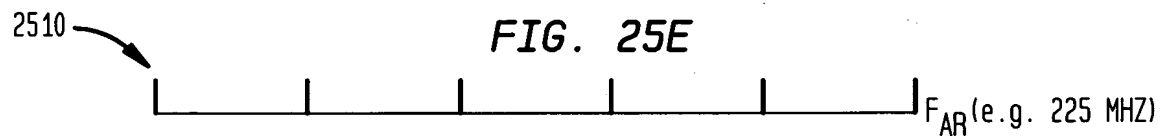
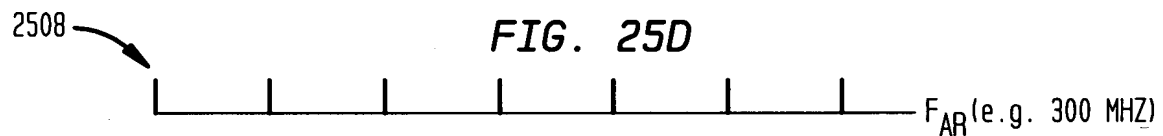
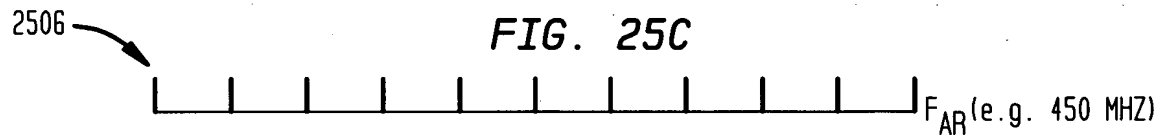
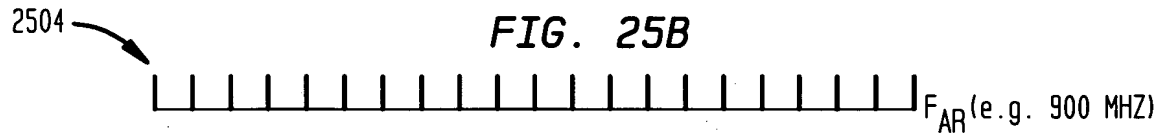
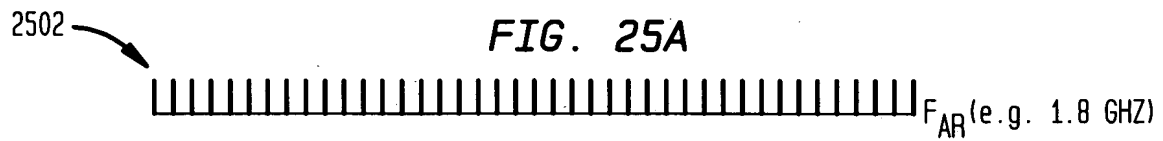


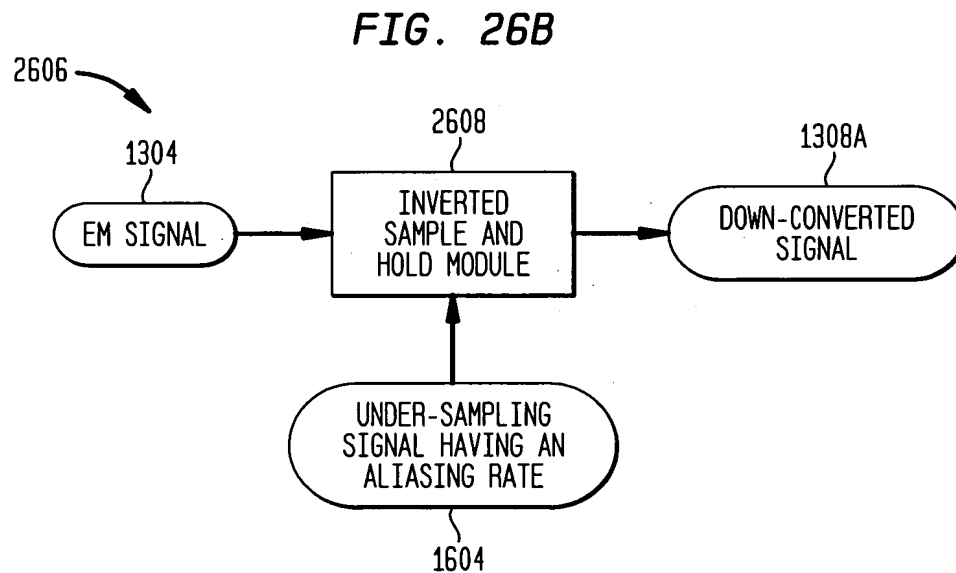
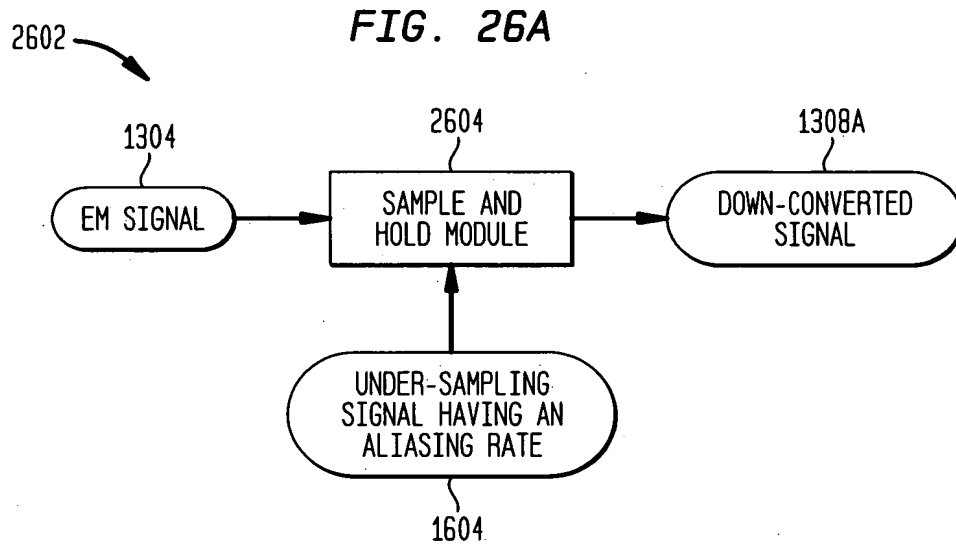
**FIG. 24B**

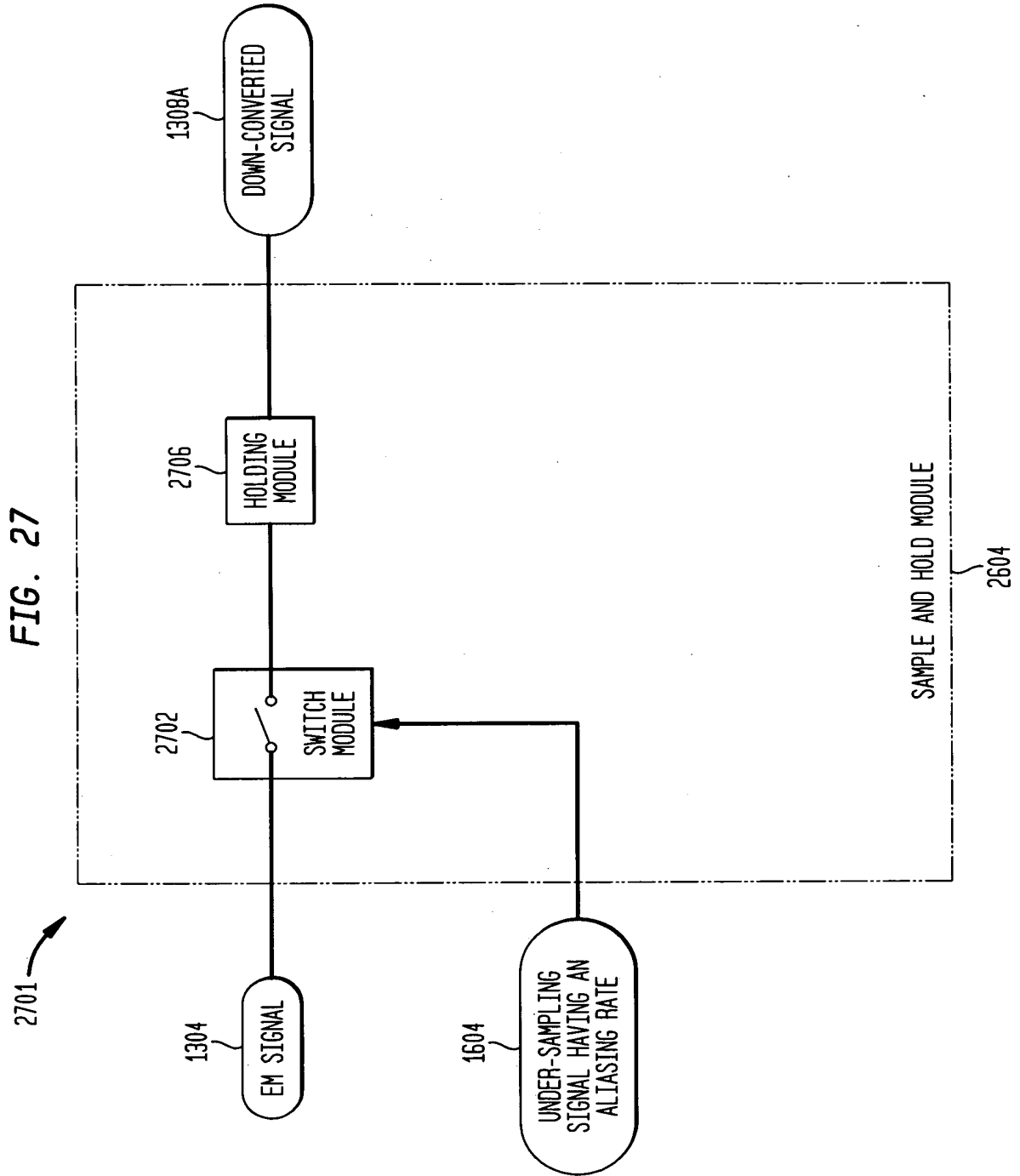


**FIG. 24C**

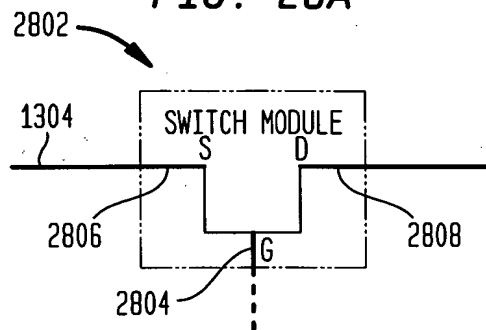




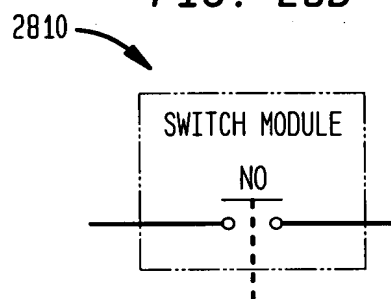




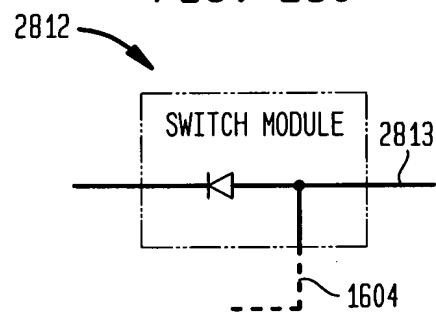
**FIG. 28A**



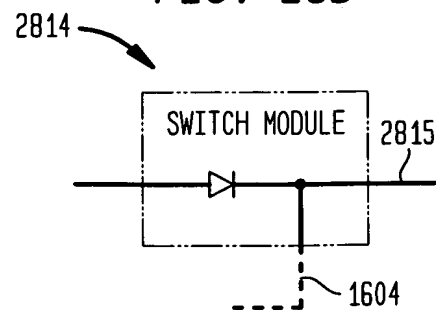
**FIG. 28B**



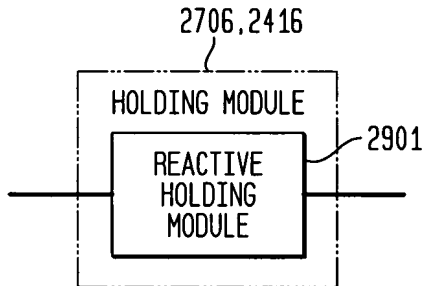
**FIG. 28C**



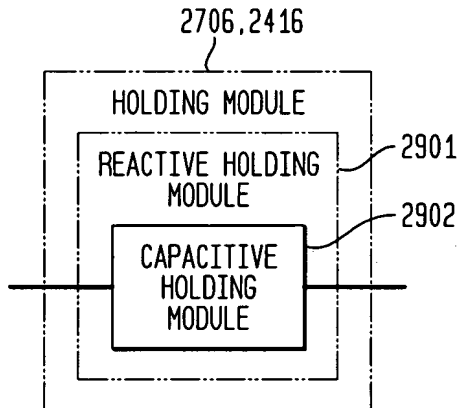
**FIG. 28D**



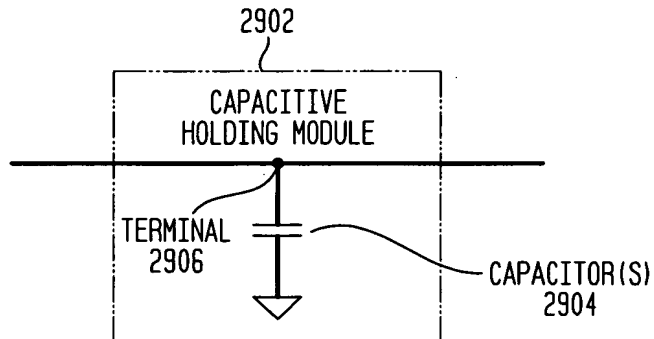
**FIG. 29A**



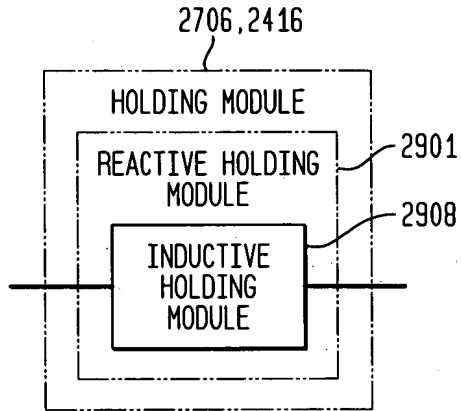
**FIG. 29B**



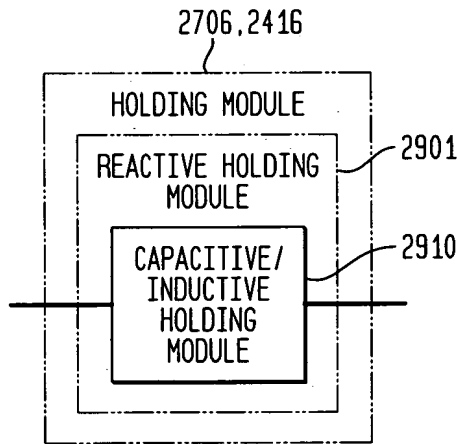
**FIG. 29C**



**FIG. 29D**



**FIG. 29E**



**FIG. 29F**

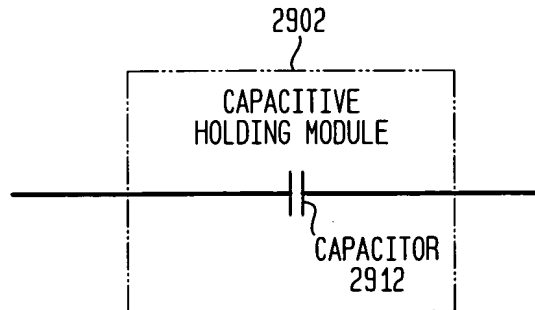
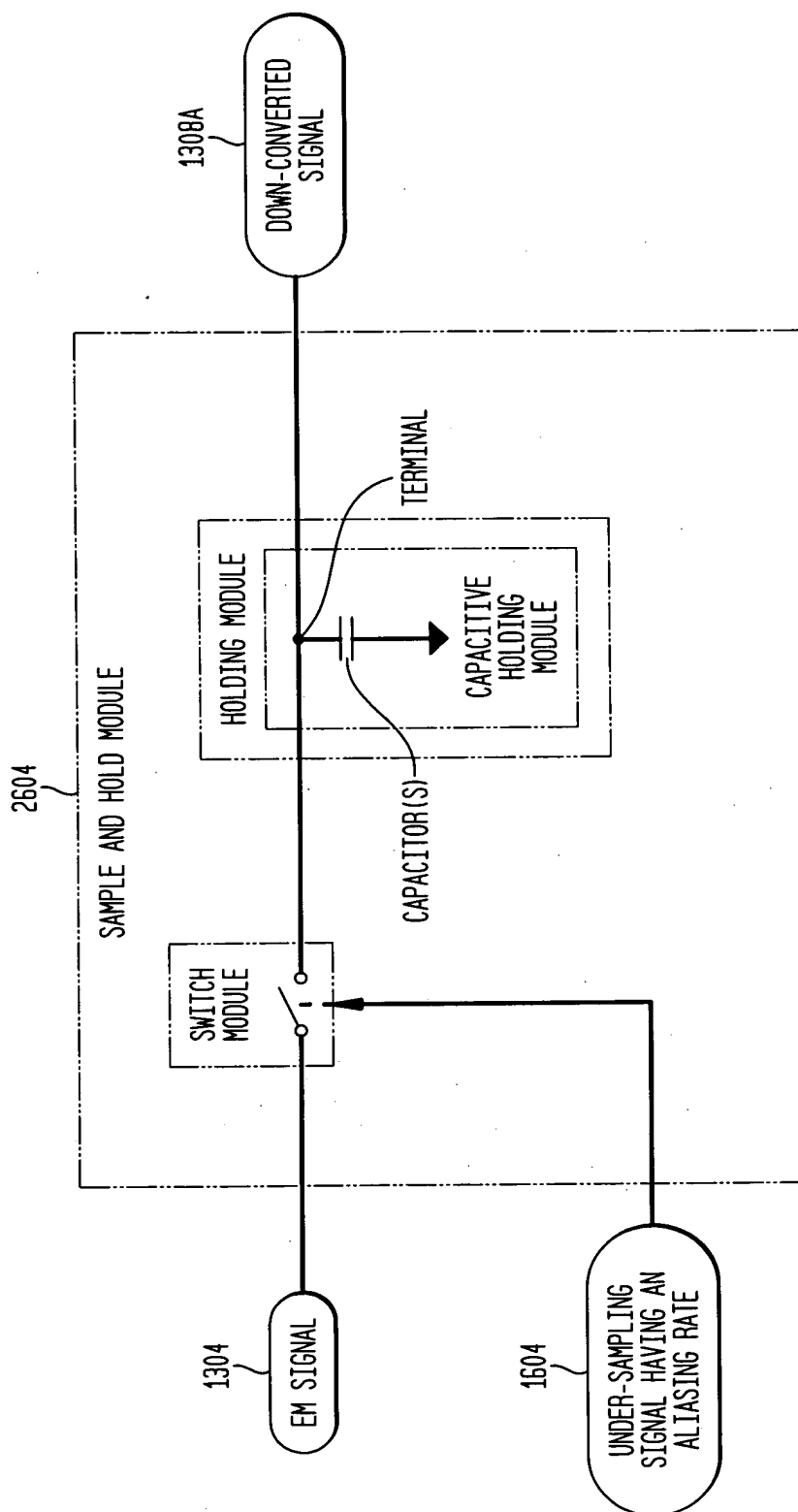
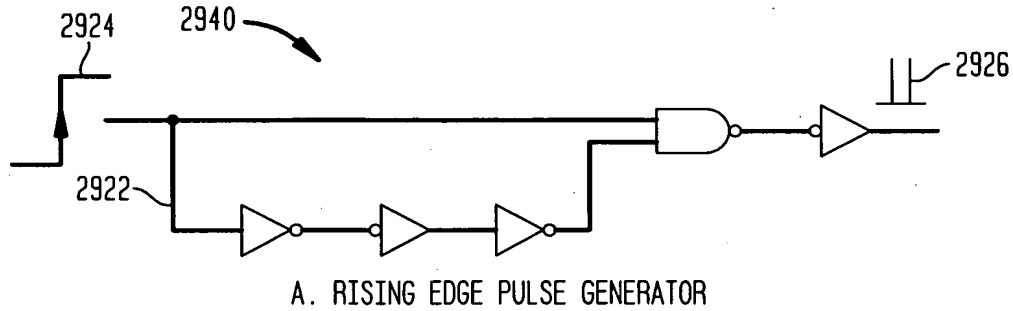


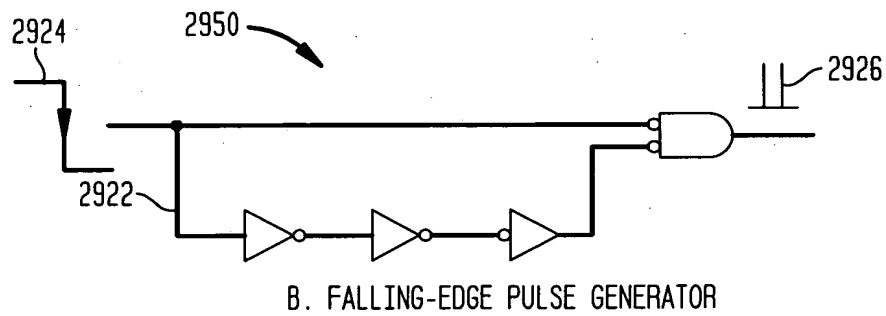
FIG. 29G



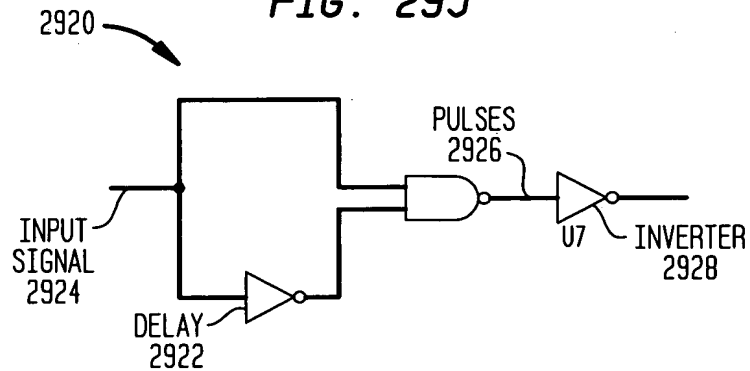
**FIG. 29H**



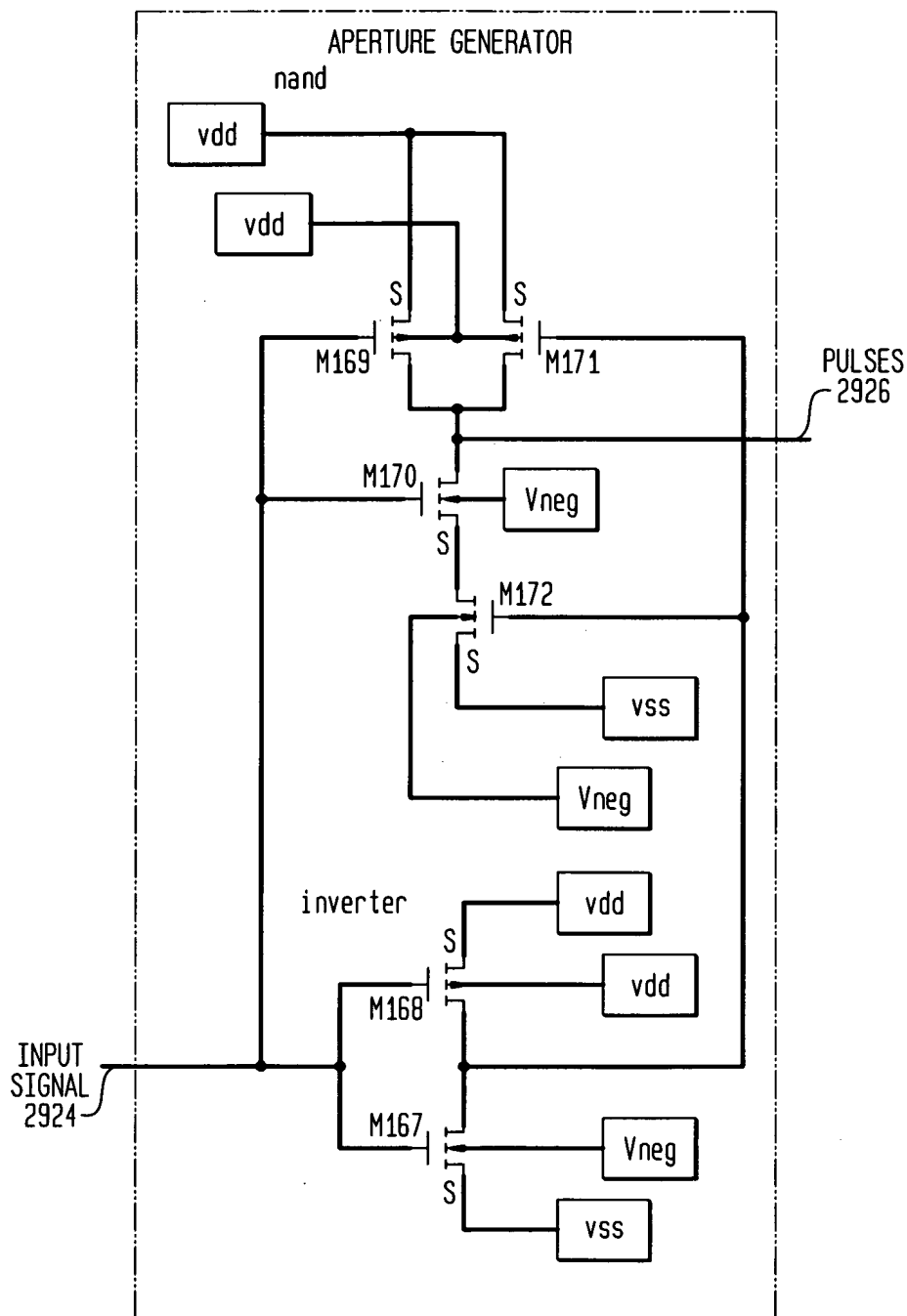
**FIG. 29I**



**FIG. 29J**



**FIG. 29K**



**FIG. 29L**

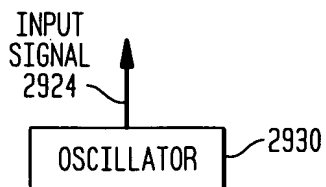
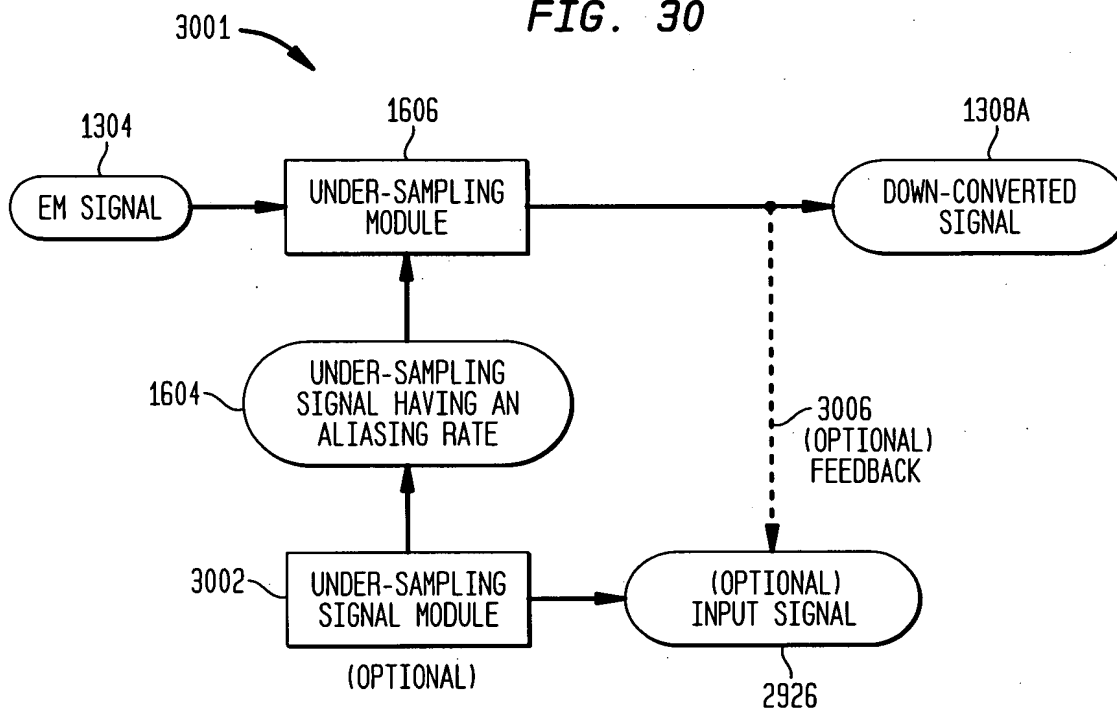


FIG. 30



**FIG. 31A**

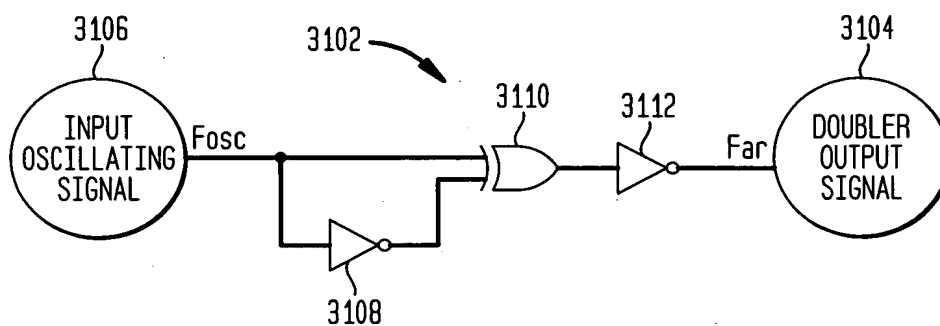


FIG. 31B

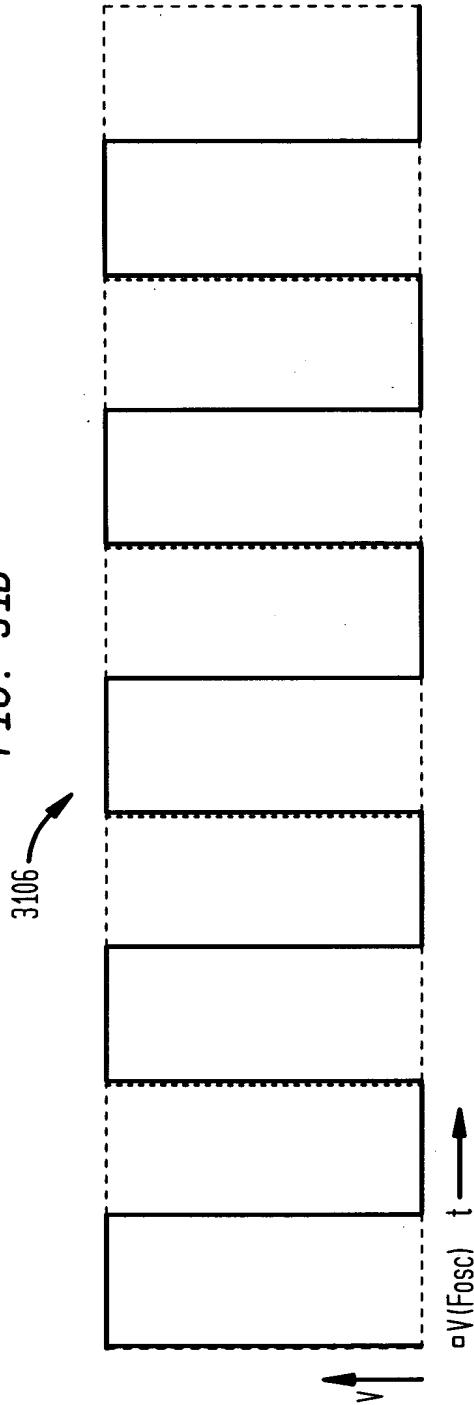


FIG. 31C

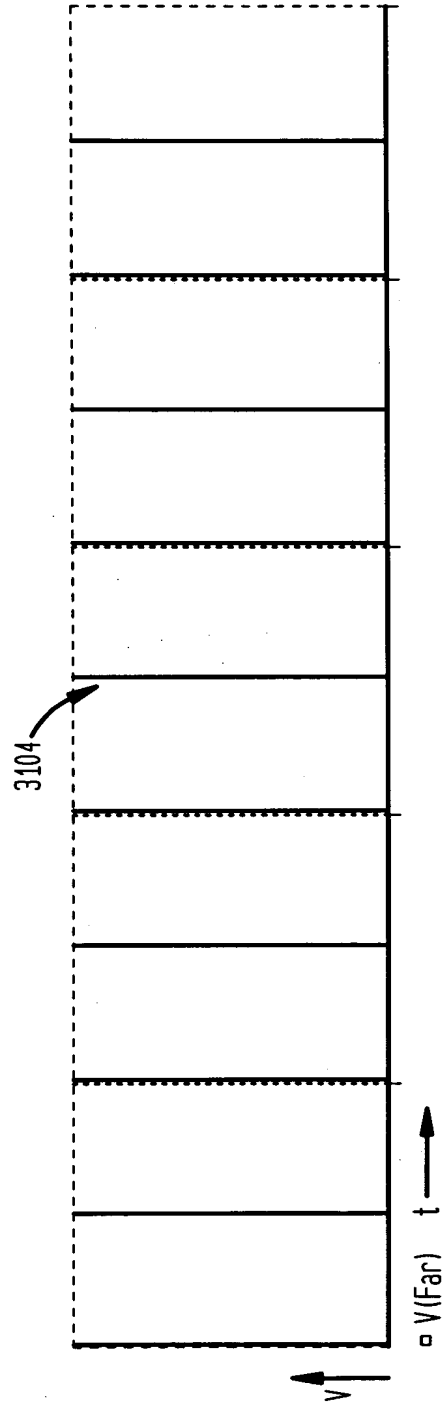


FIG. 32A

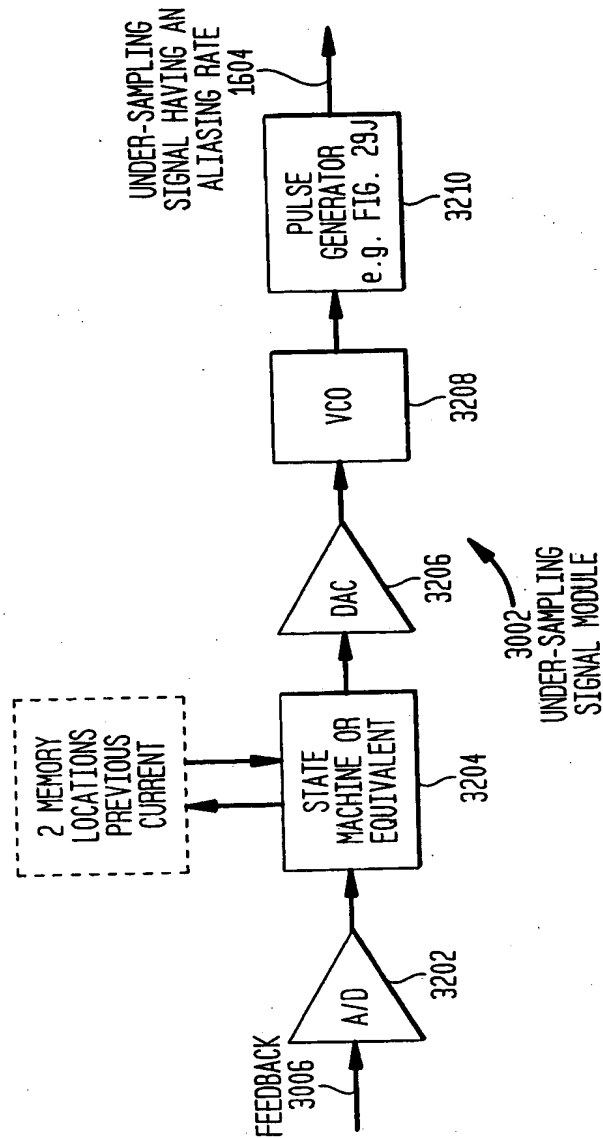
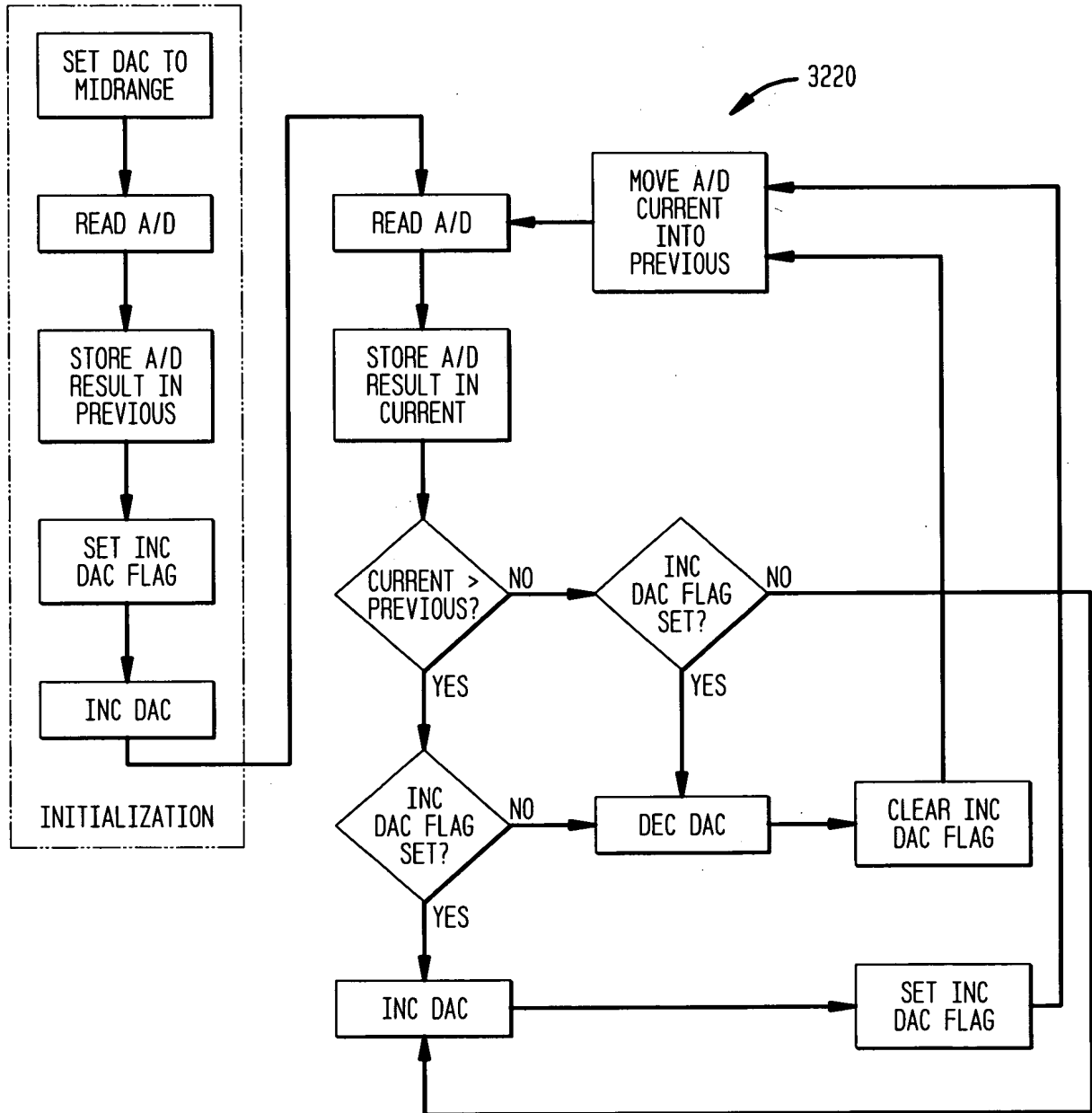
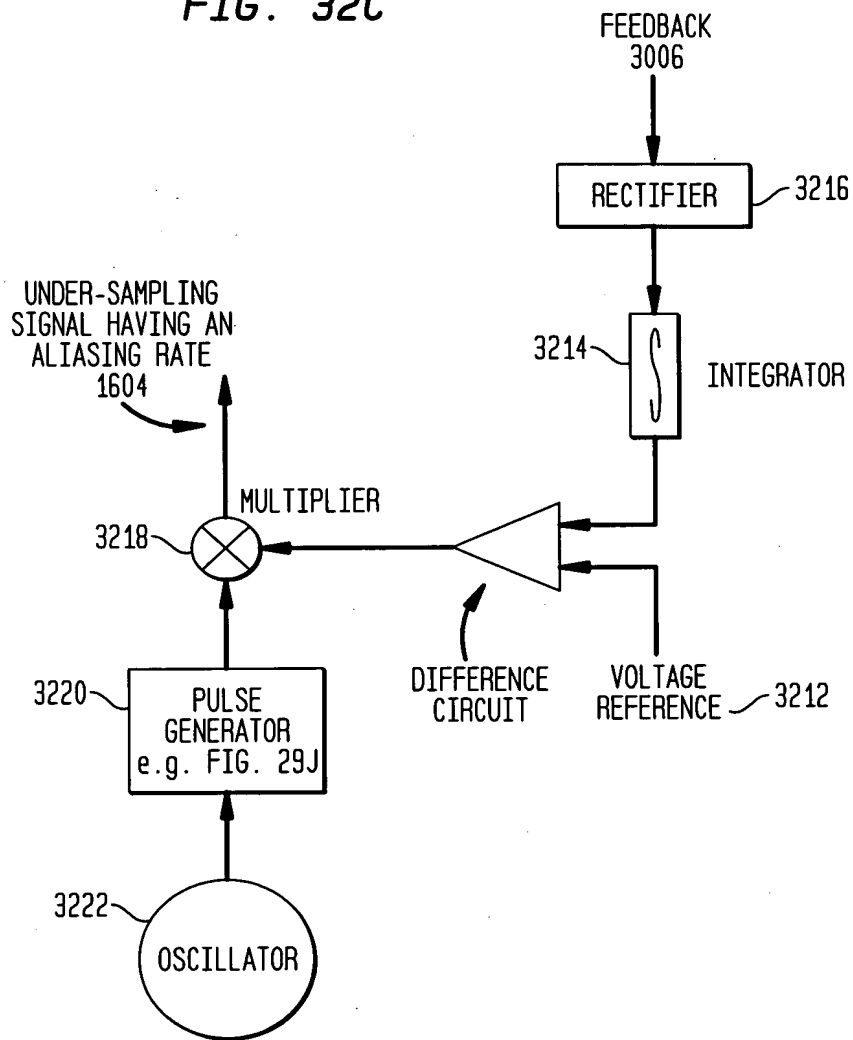


FIG. 32B



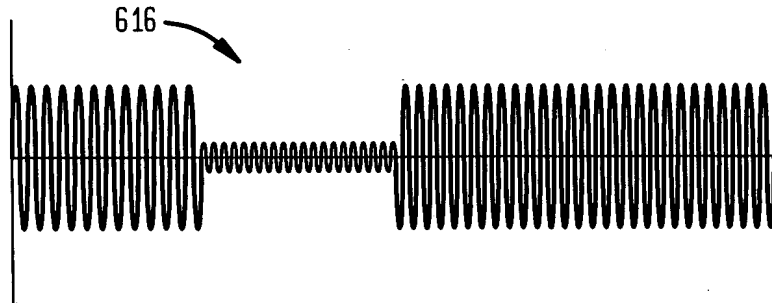
STATE MACHINE FLOWCHART

**FIG. 32C**

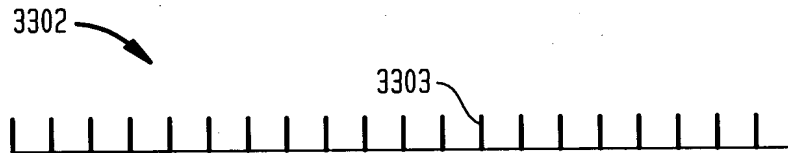


**ENERGY TRANSFER SIGNAL MODULE 3002**

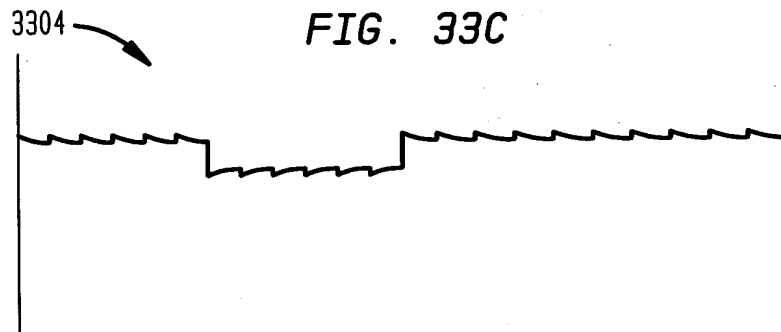
**FIG. 33A**



**FIG. 33B**



**FIG. 33C**



**FIG. 33D**

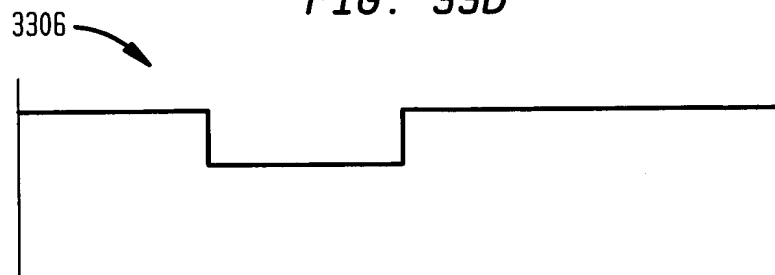


FIG. 34A

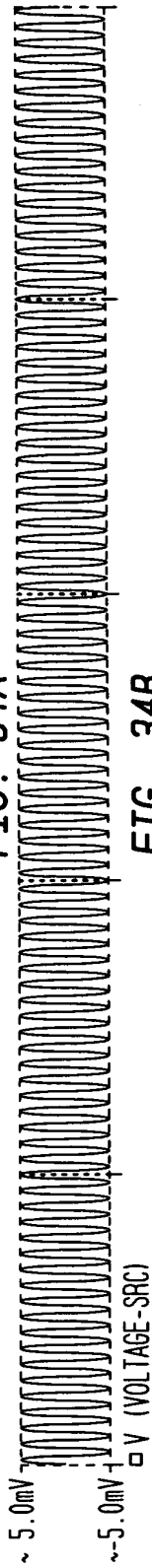


FIG. 34B

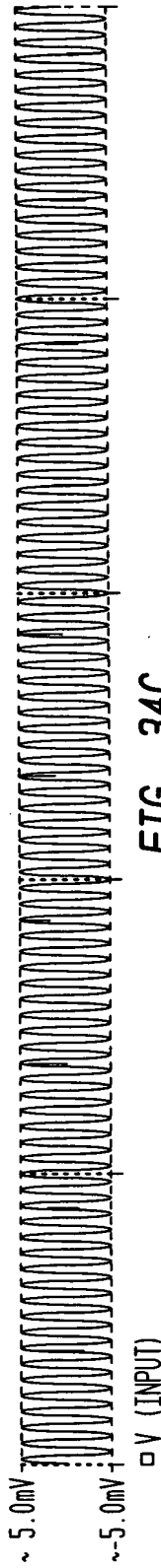


FIG. 34C

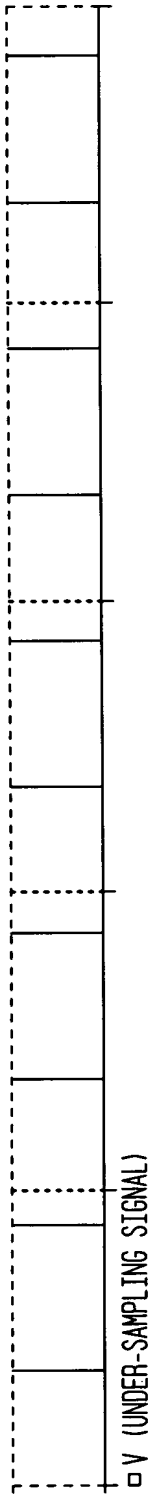


FIG. 34D

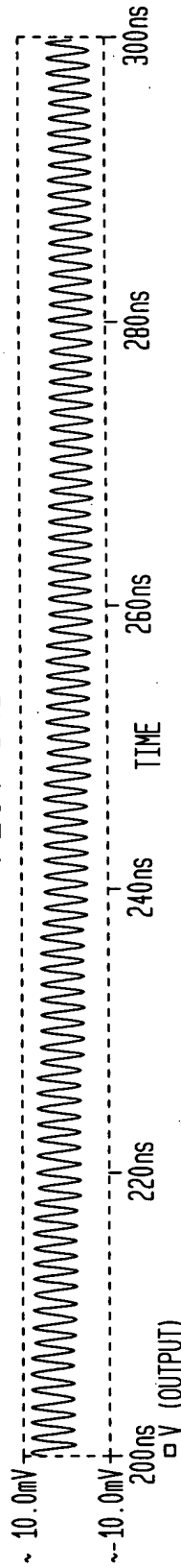


FIG. 34E

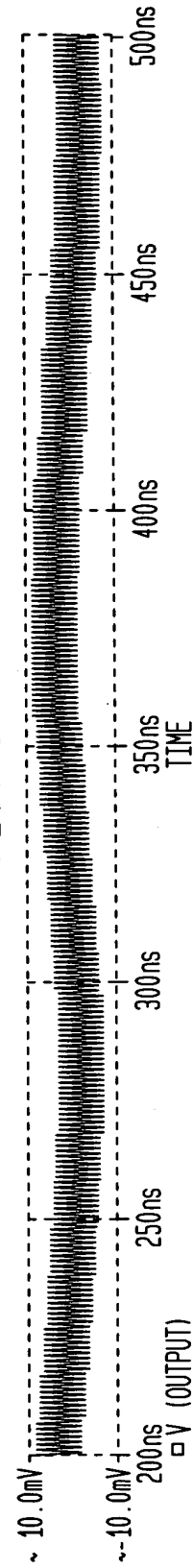


FIG. 34F

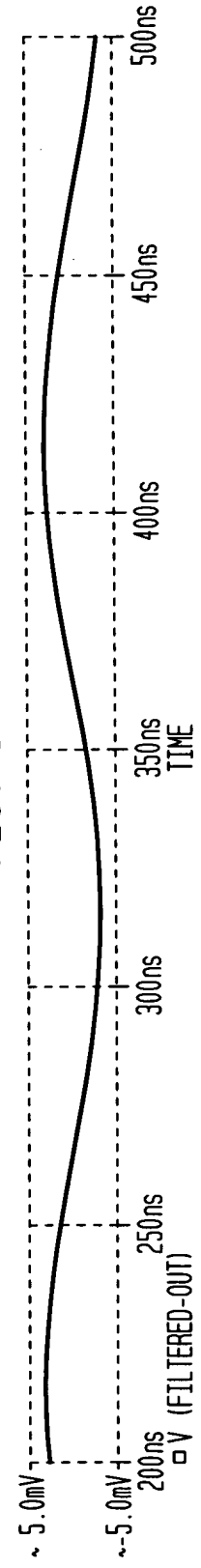


FIG. 35A

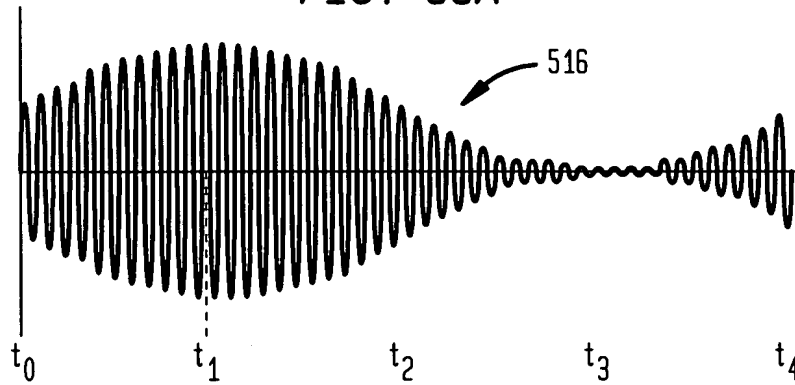


FIG. 35B

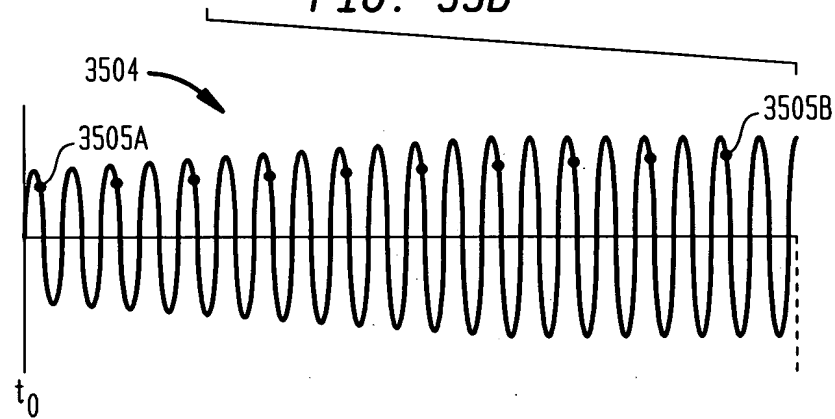


FIG. 35C

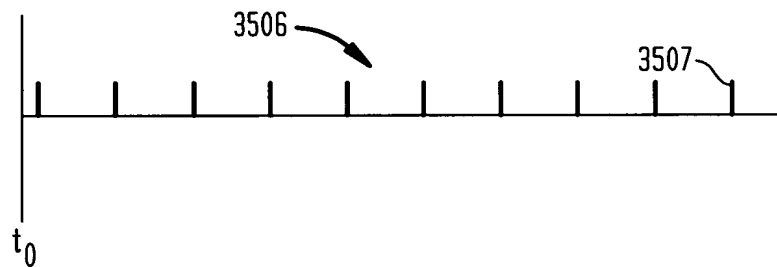


FIG. 35D

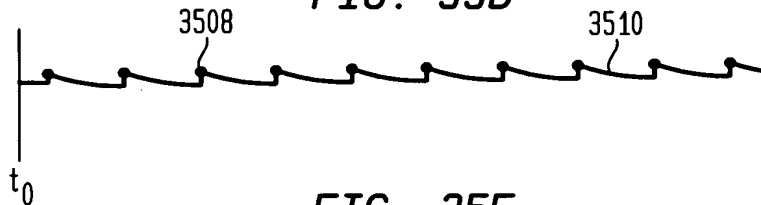
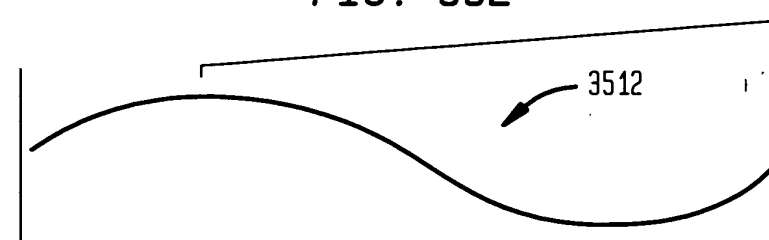
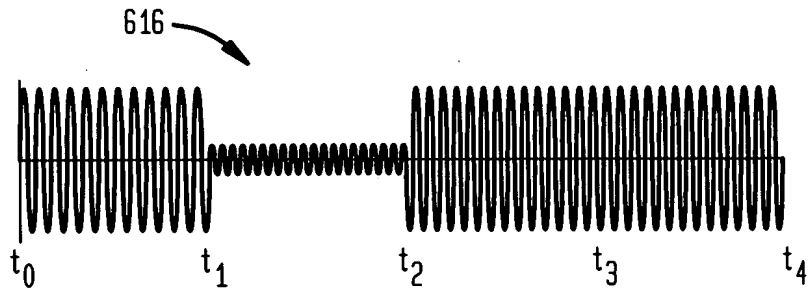


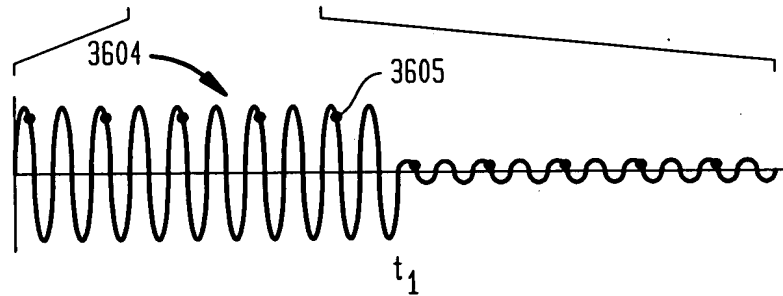
FIG. 35E



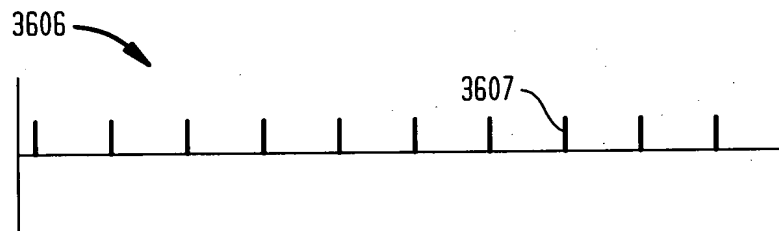
**FIG. 36A**



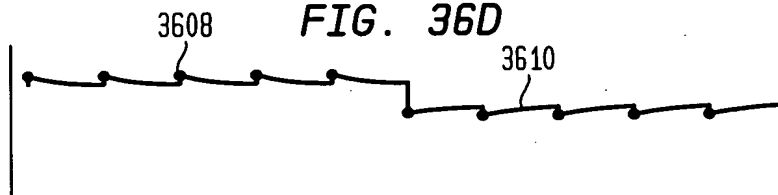
**FIG. 36B**



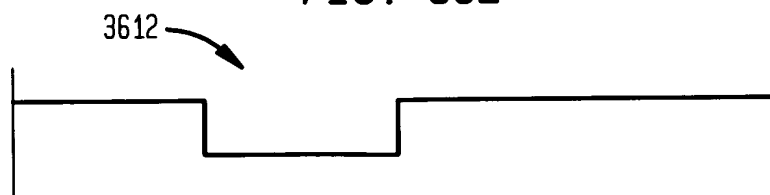
**FIG. 36C**

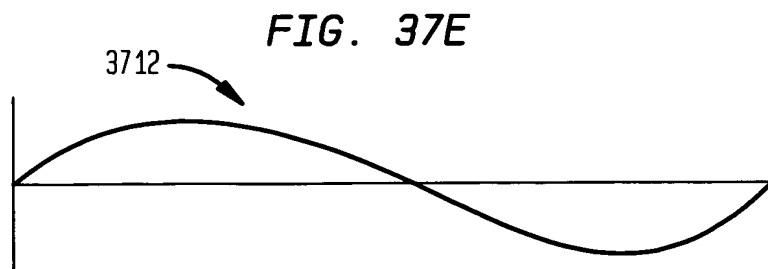
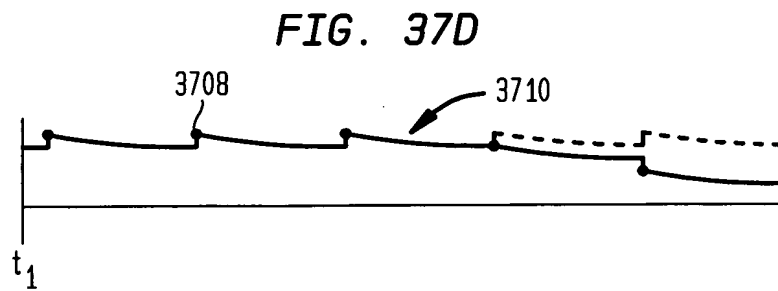
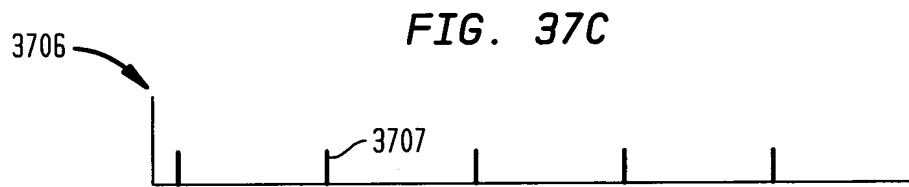
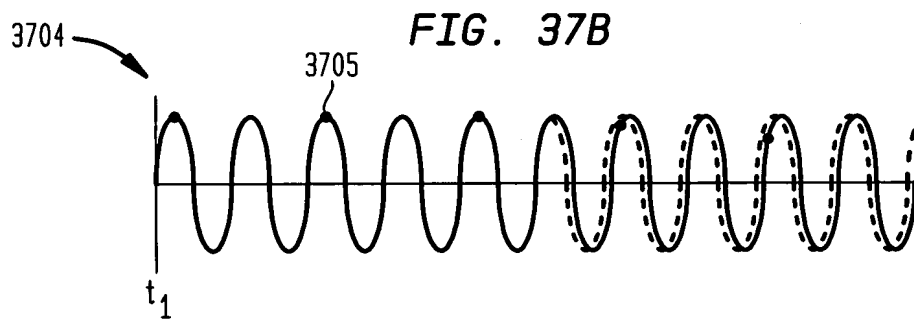
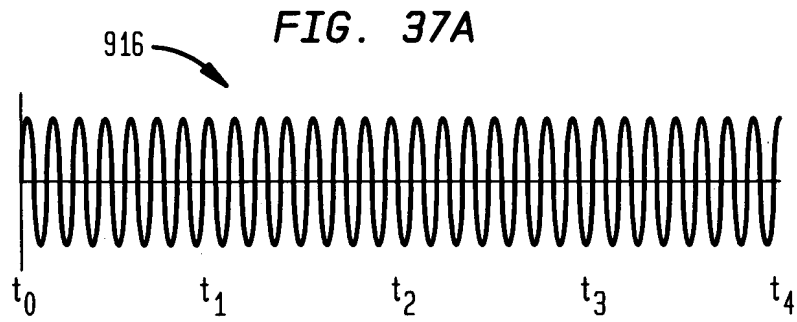


**FIG. 36D**

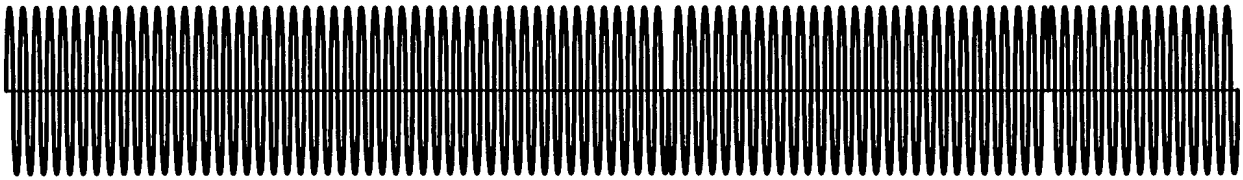


**FIG. 36E**

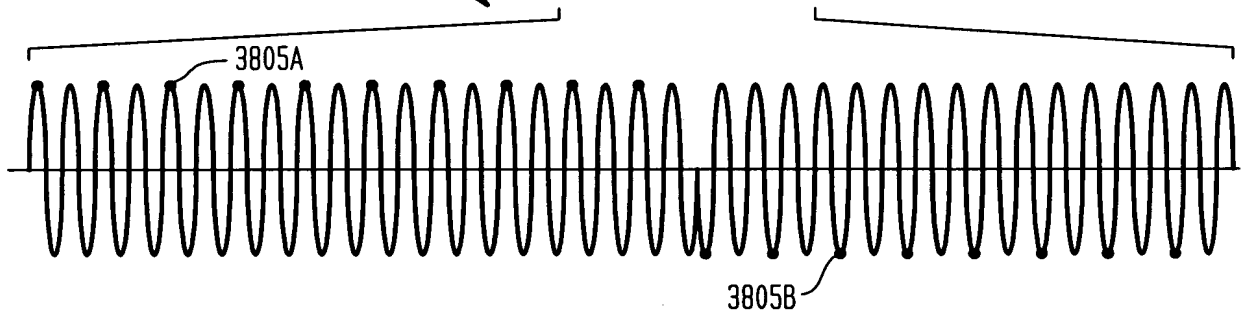




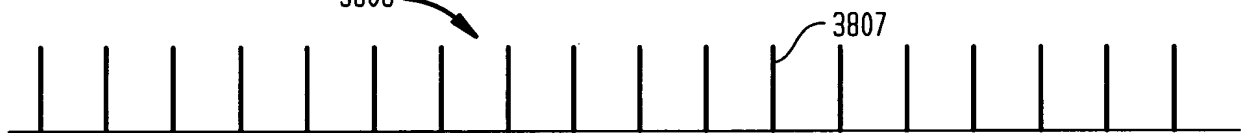
1016 **FIG. 38A**



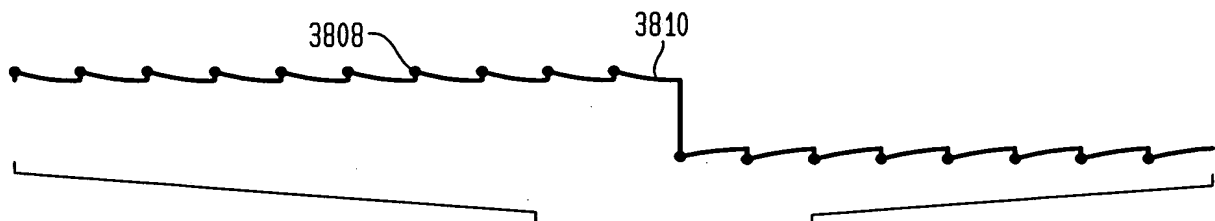
3804 **FIG. 38B**



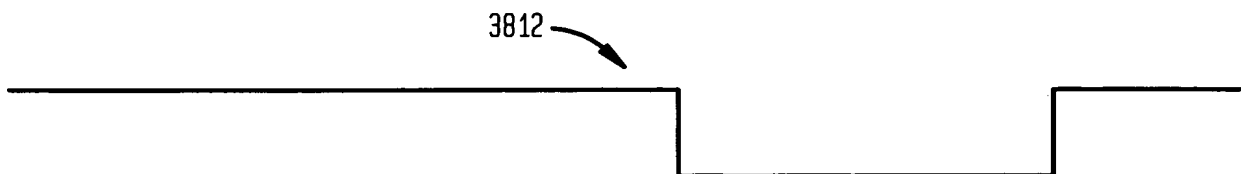
3806 **FIG. 38C**

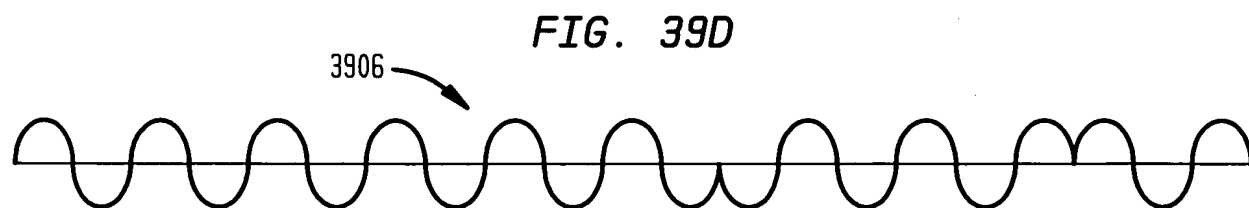
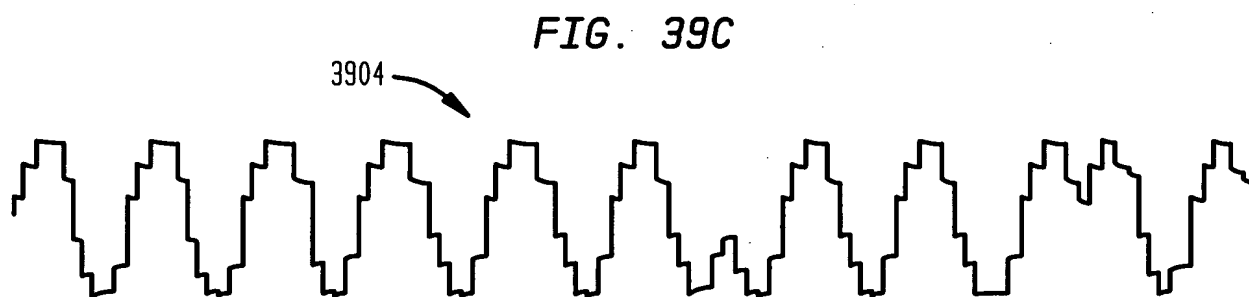
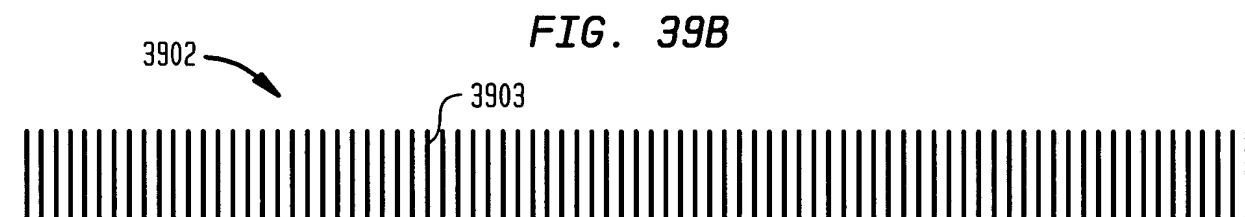
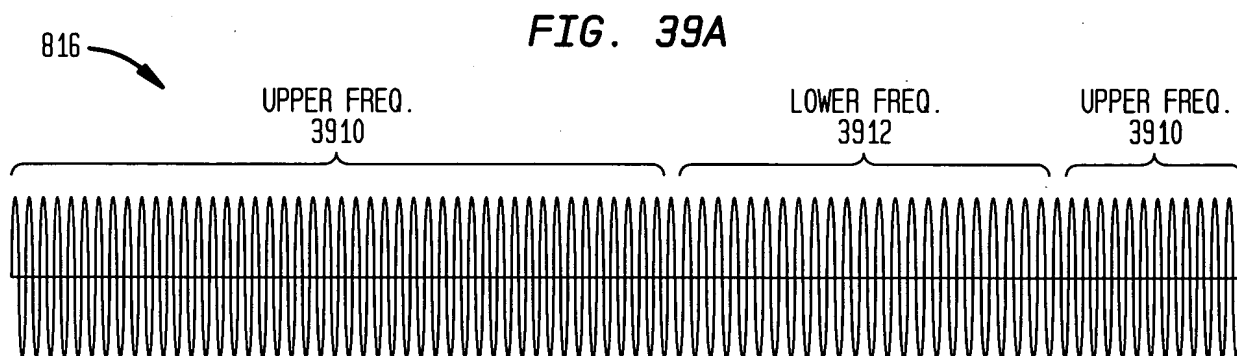


**FIG. 38D**

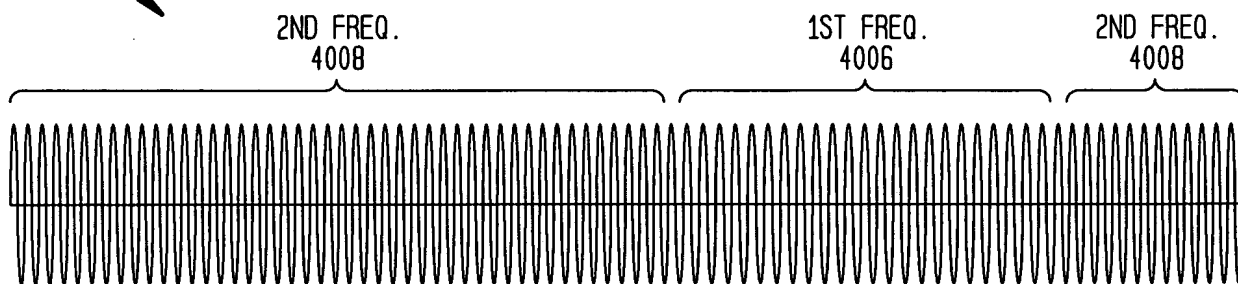


**FIG. 38E**

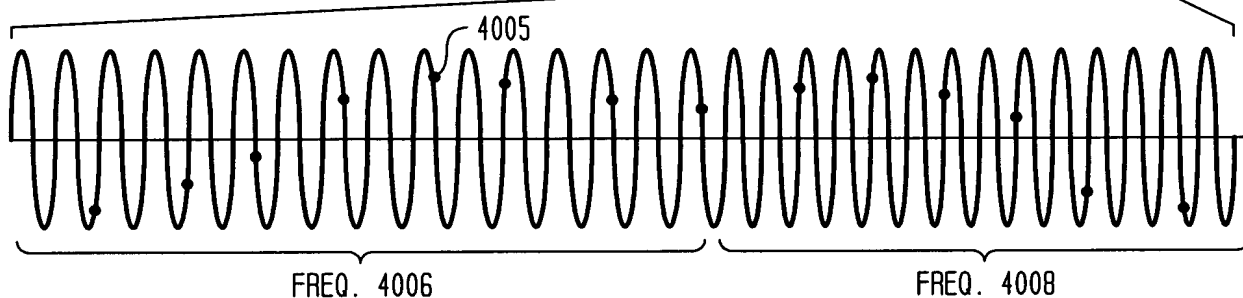




816 **FIG. 40A**



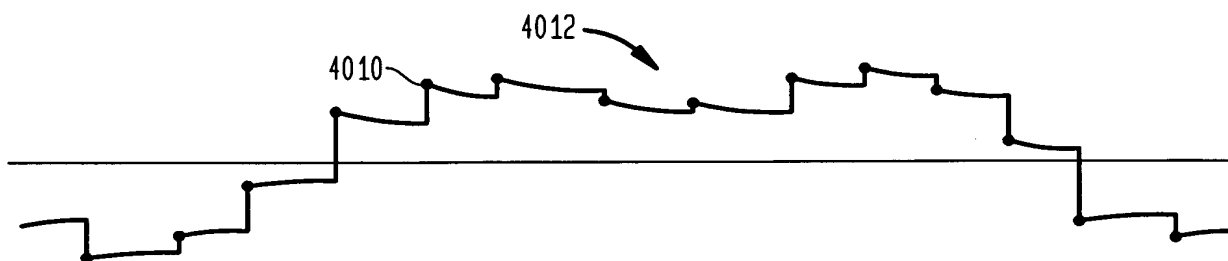
4004 **FIG. 40B**



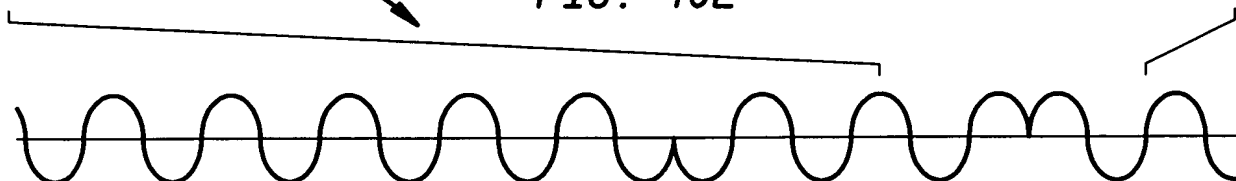
4007 **FIG. 40C**



**FIG. 40D**



4014 **FIG. 40E**



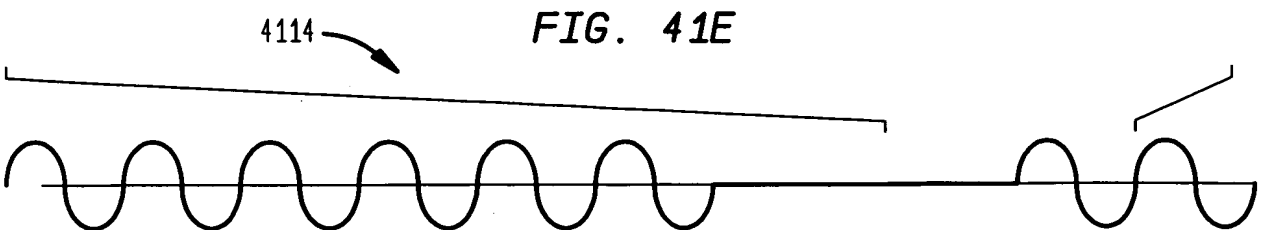
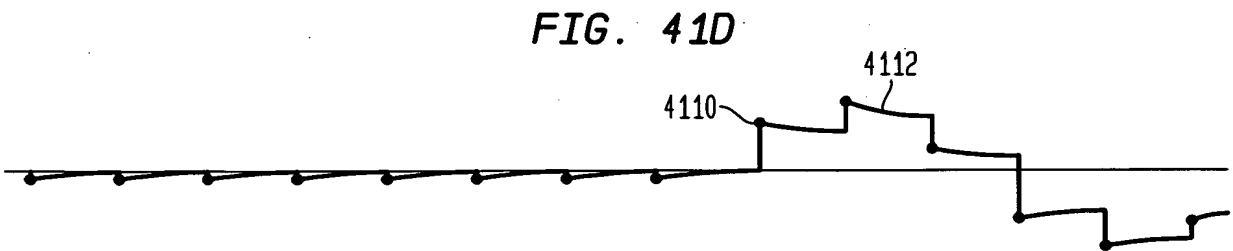
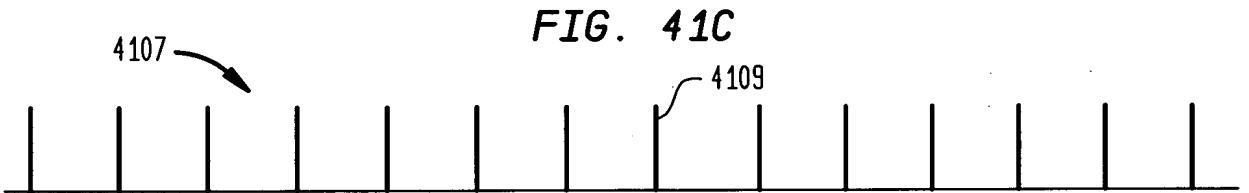
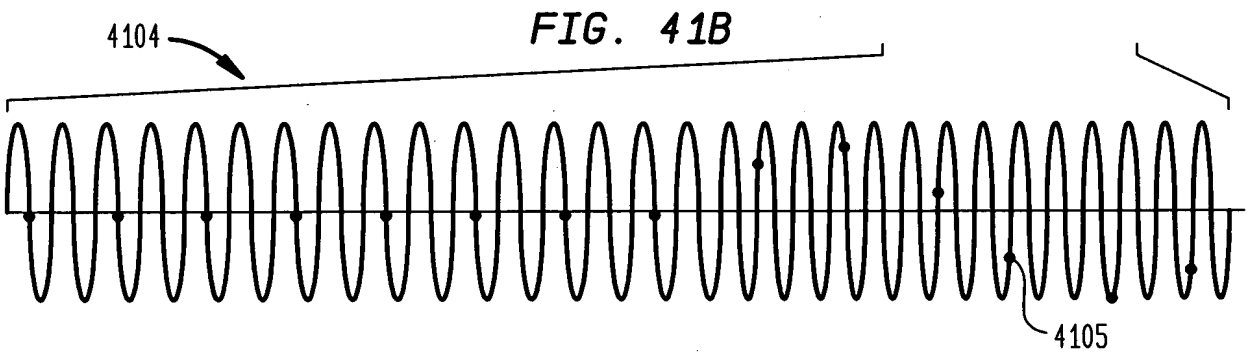
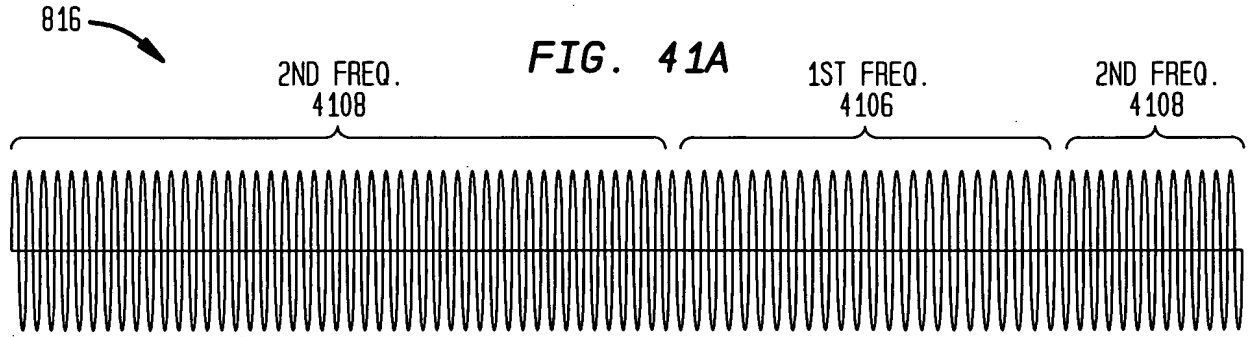
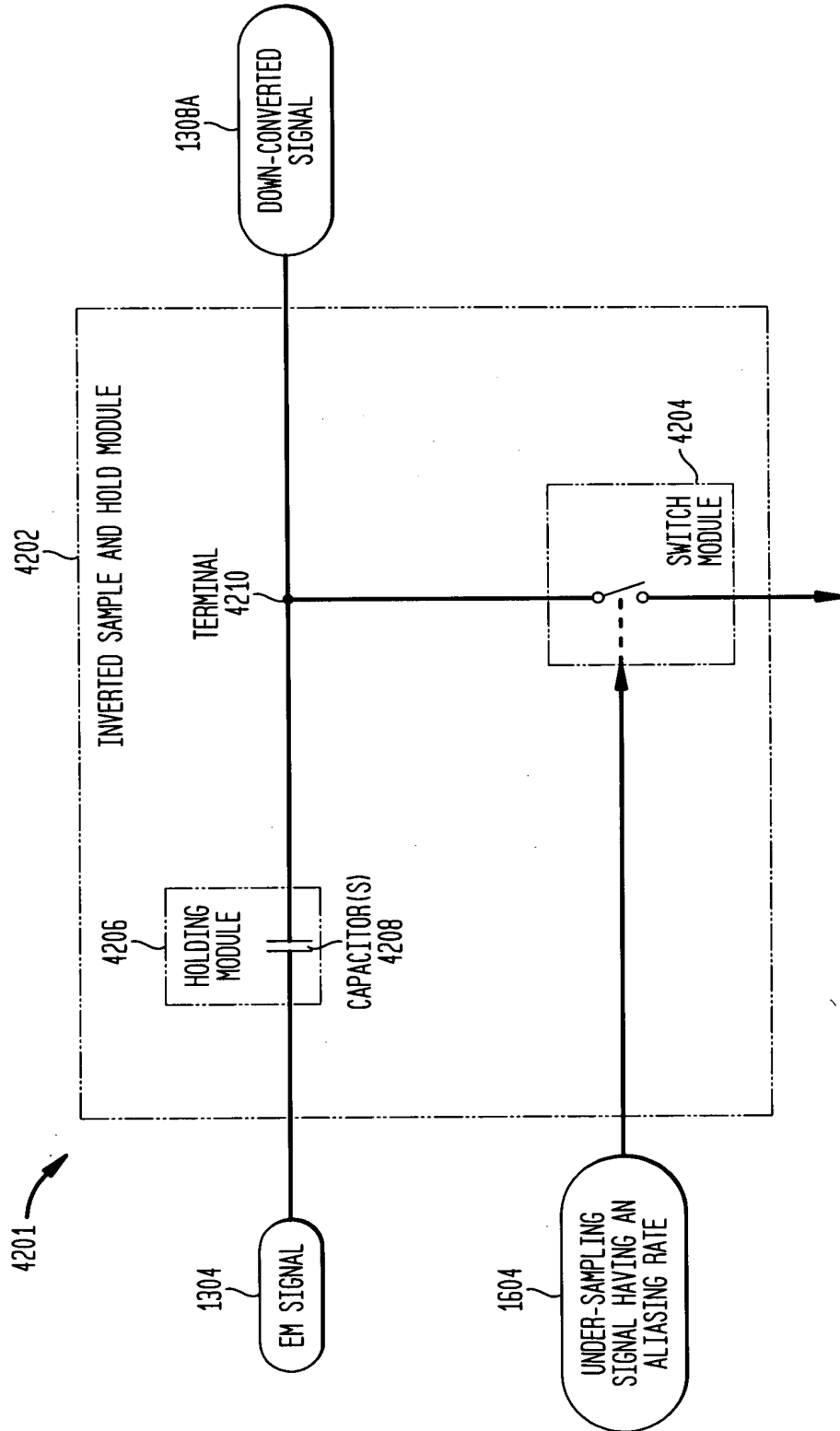


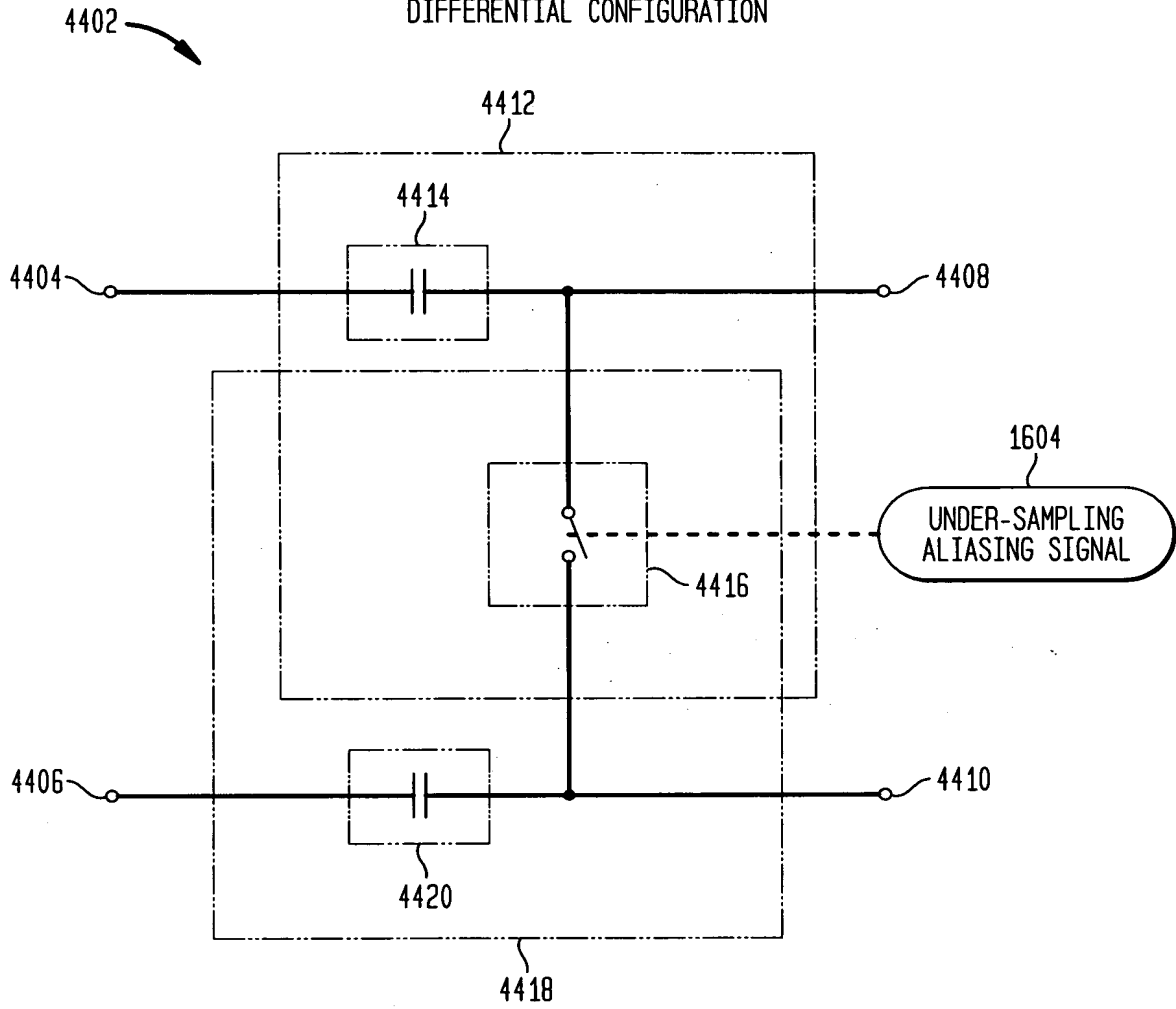
FIG. 42



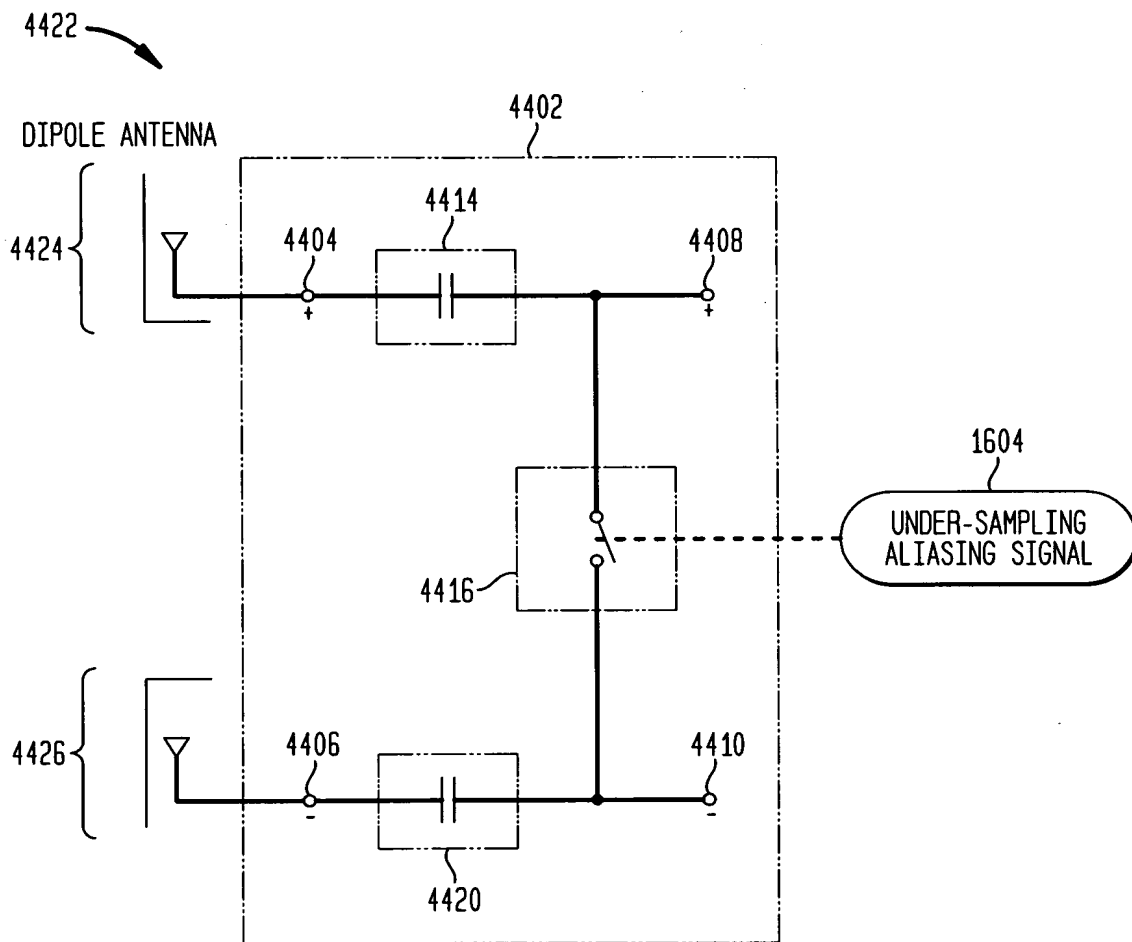
**FIG. 43**

$$\Delta q(t) = 2 \cdot C \cdot A \cdot \sin\left(\frac{1}{2} \cdot T\right) \cdot \cos\left(t - \frac{1}{2} \cdot T\right)$$

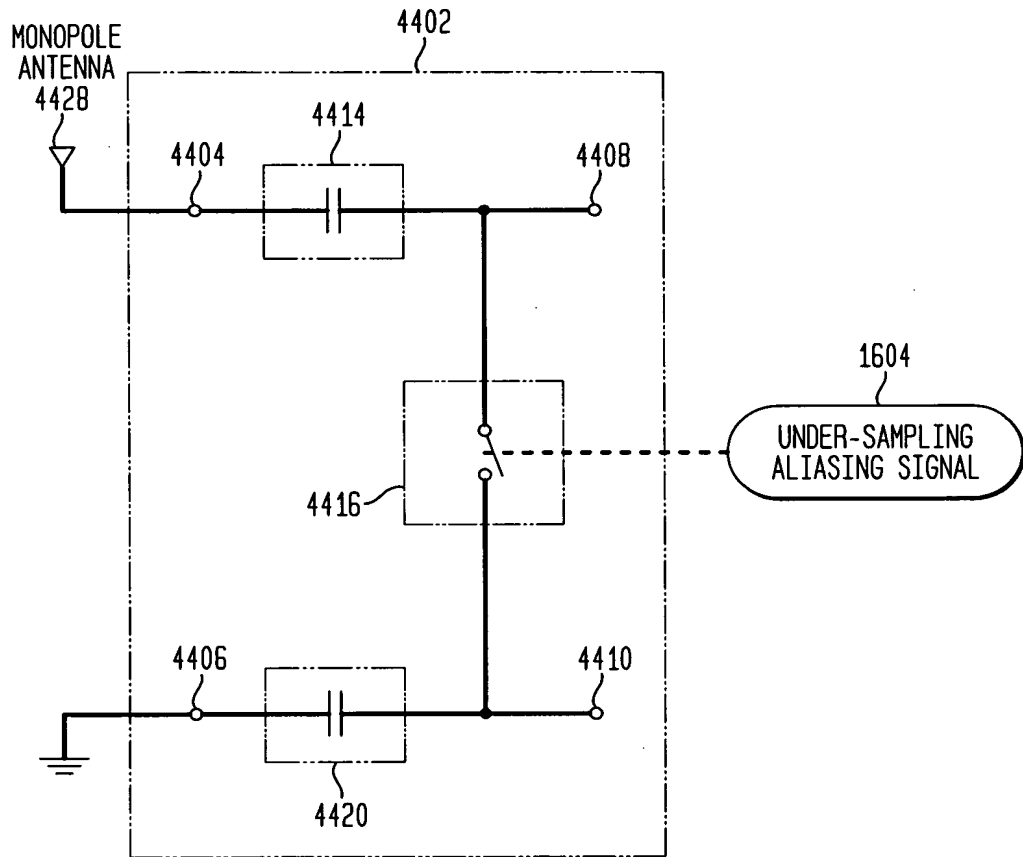
**FIG. 44A**  
DIFFERENTIAL CONFIGURATION



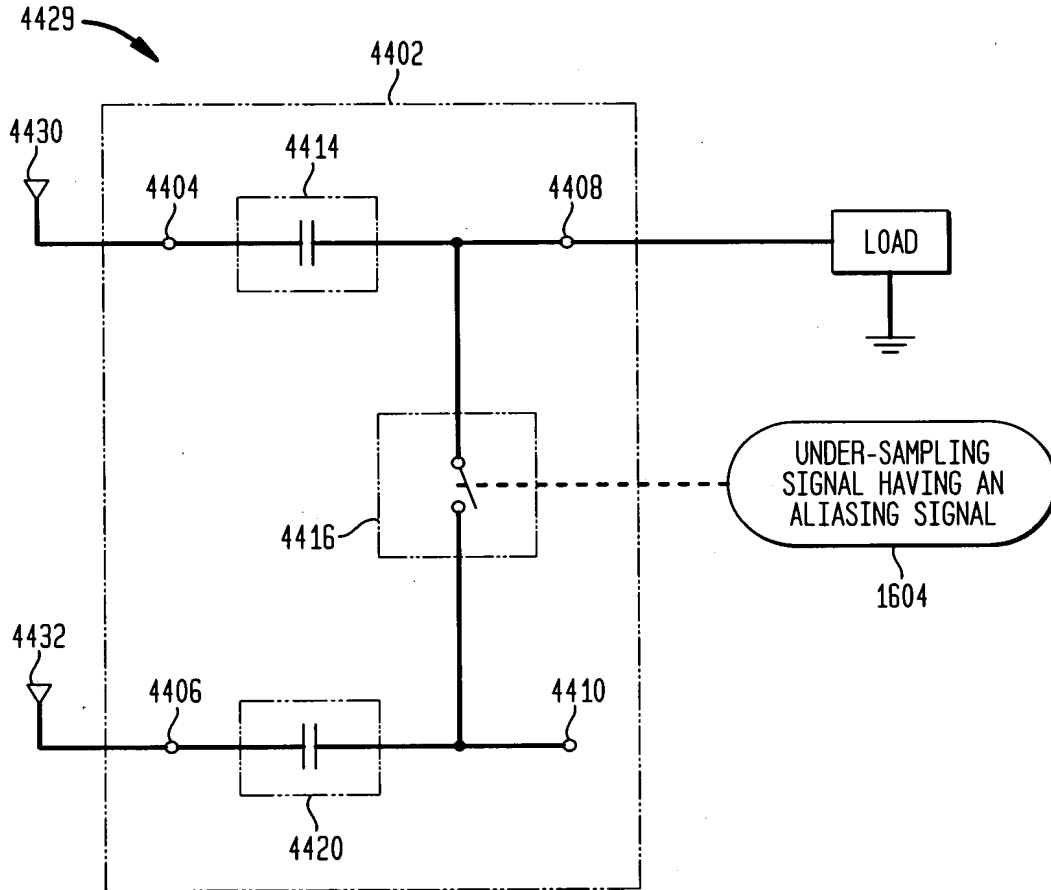
**FIG. 44B**  
 DIFFERENTIAL INPUT TO DIFFERENTIAL OUTPUT



**FIG. 44C**  
 SINGLE INPUT TO DIFFERENTIAL OUTPUT

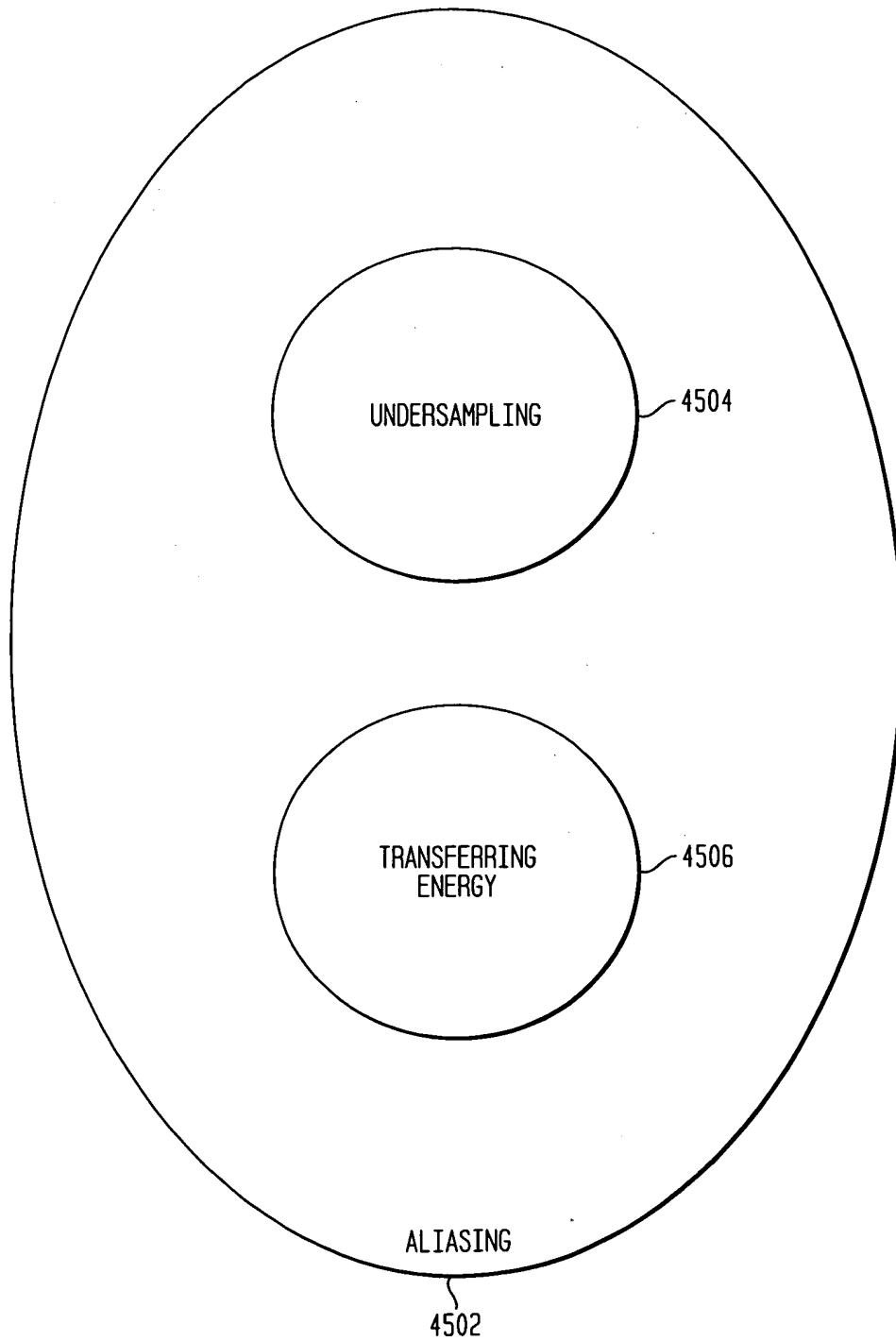


**FIG. 44D**  
 DIFFERENTIAL INPUT TO SINGLE OUTPUT

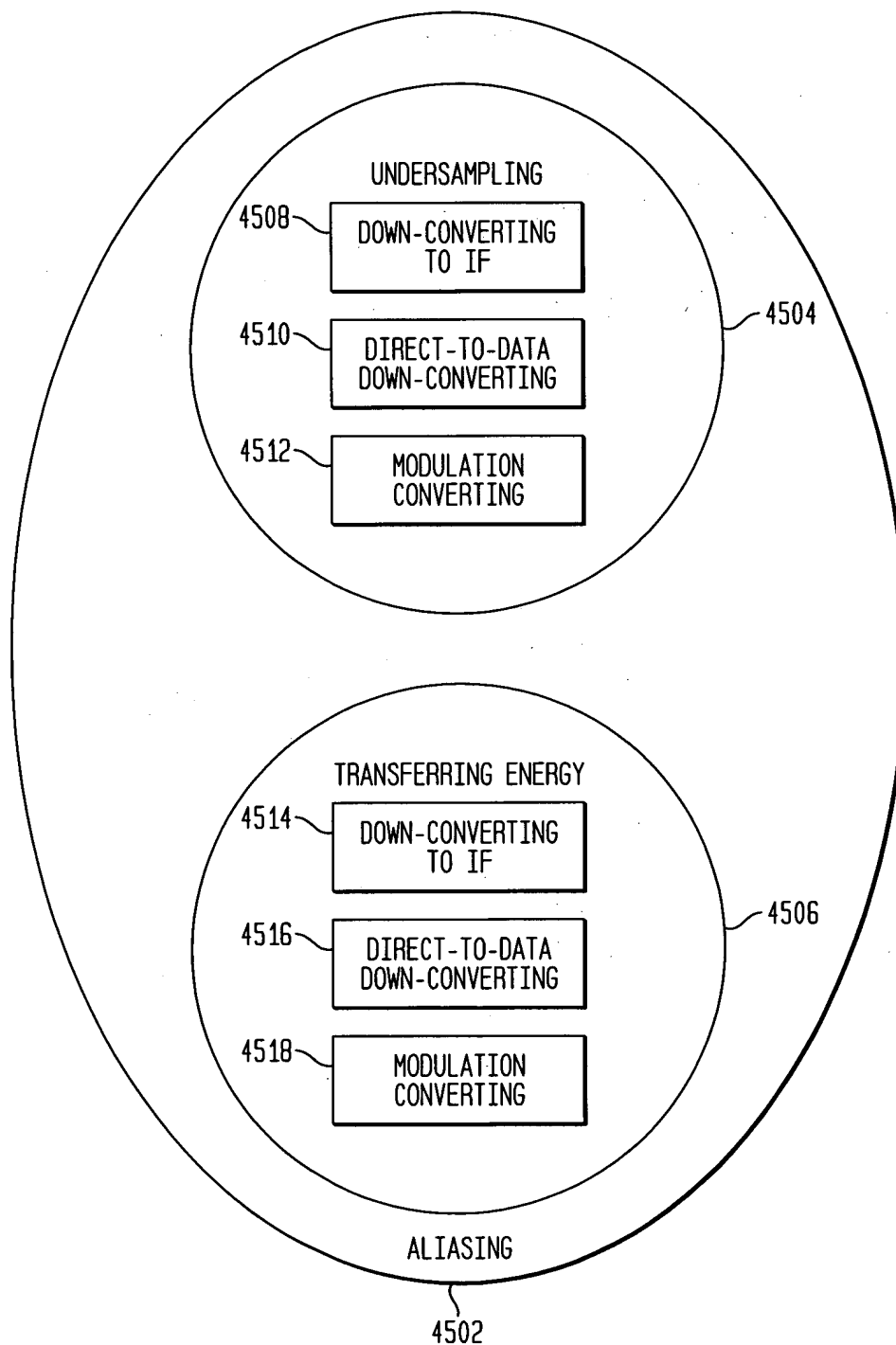




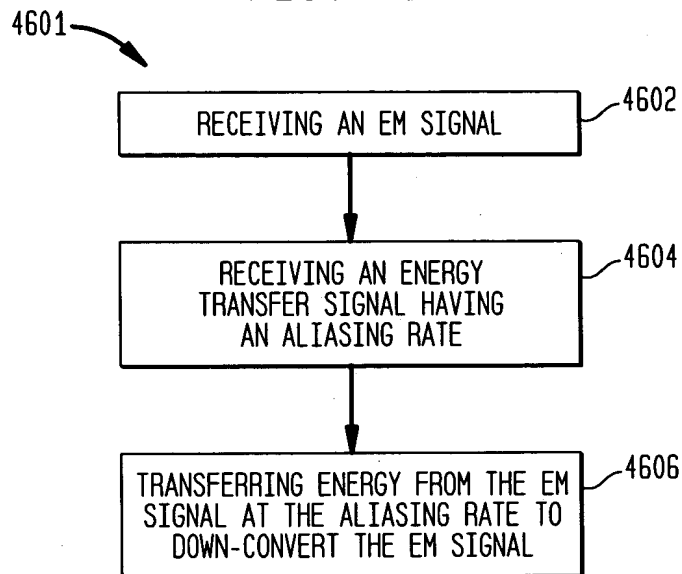
**FIG. 45A**



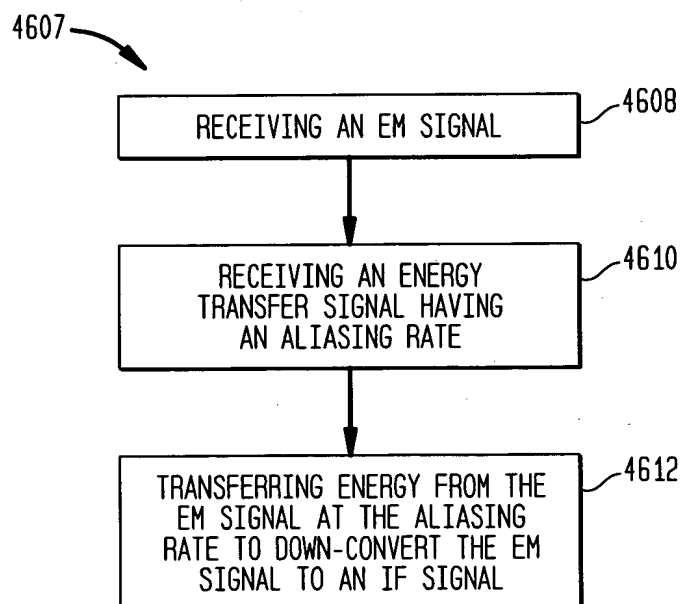
**FIG. 45B**



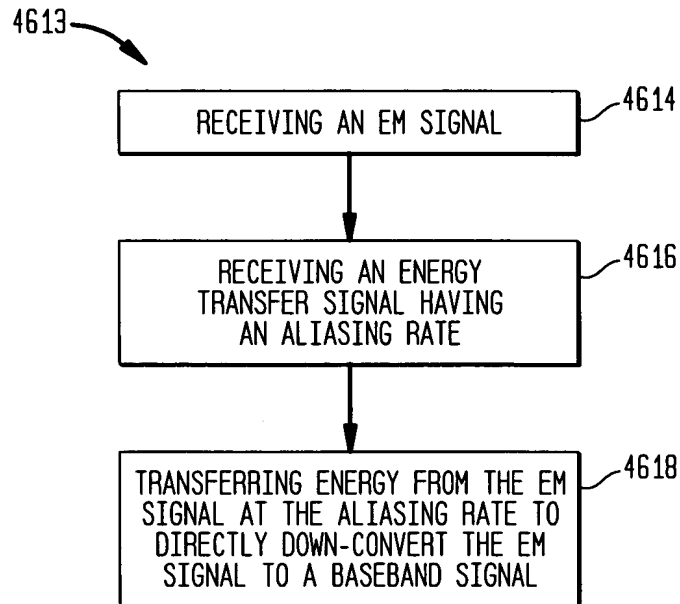
**FIG. 46A**



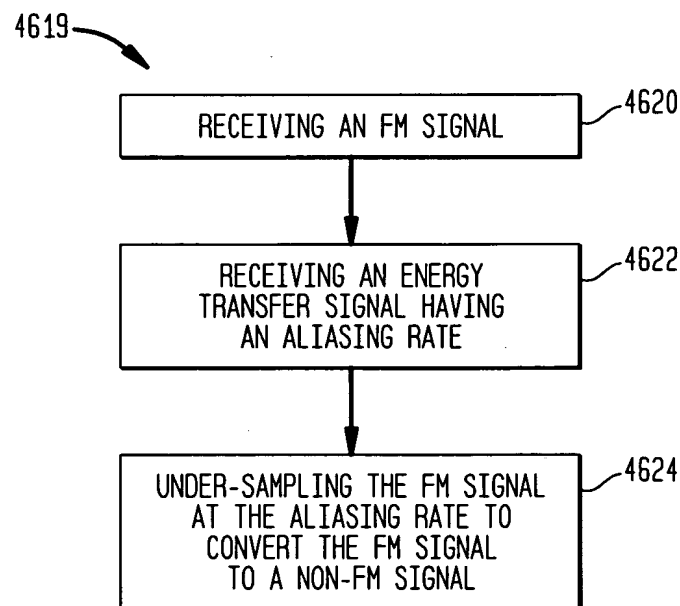
**FIG. 46B**



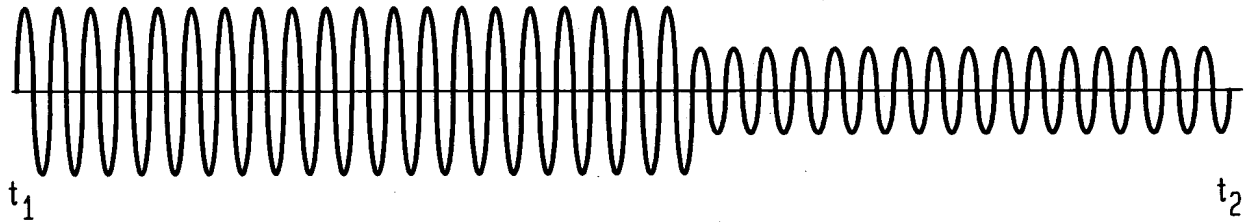
**FIG. 46C**



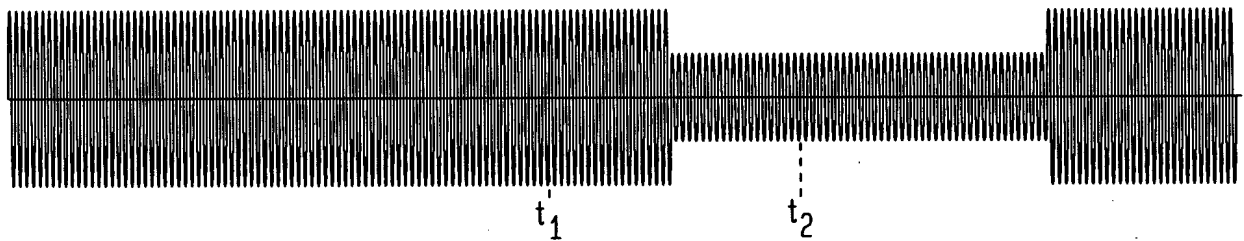
**FIG. 46D**



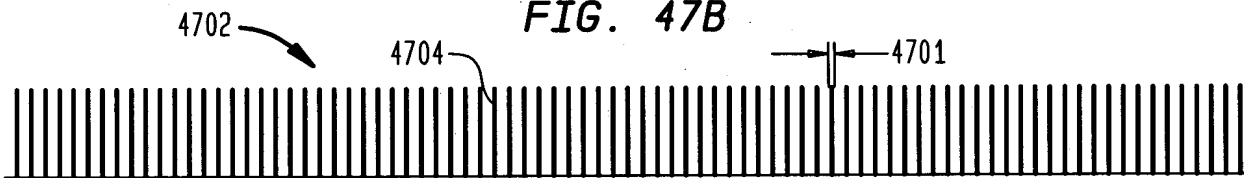
**FIG. 47E**



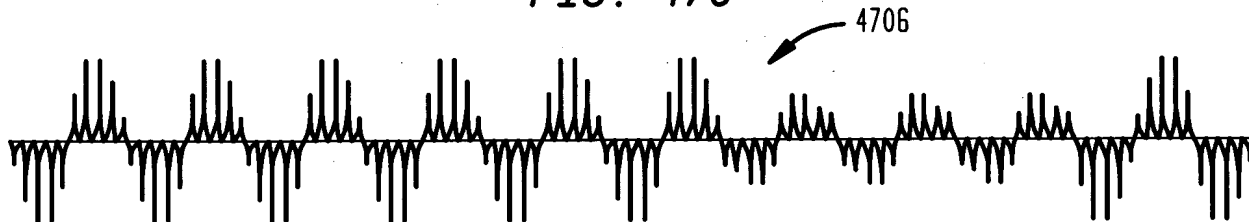
**FIG. 47A**



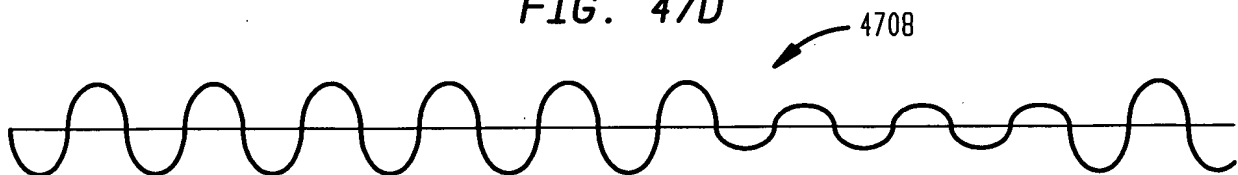
**FIG. 47B**



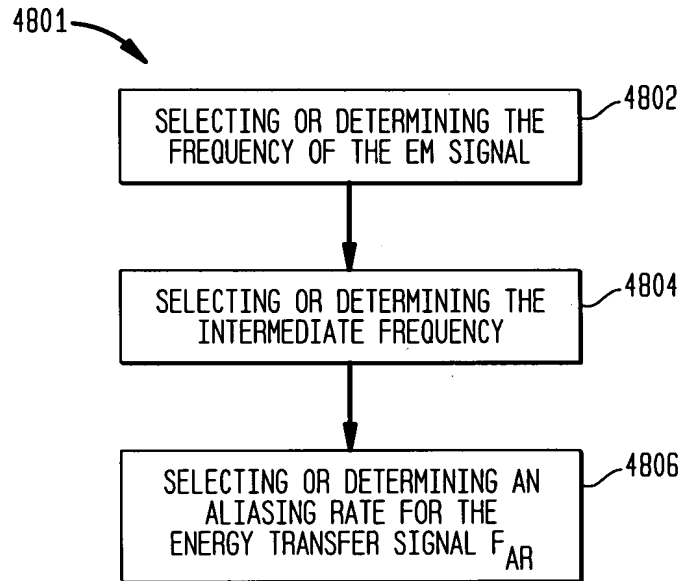
**FIG. 47C**

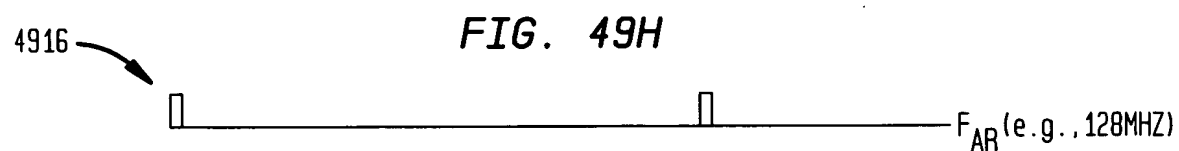
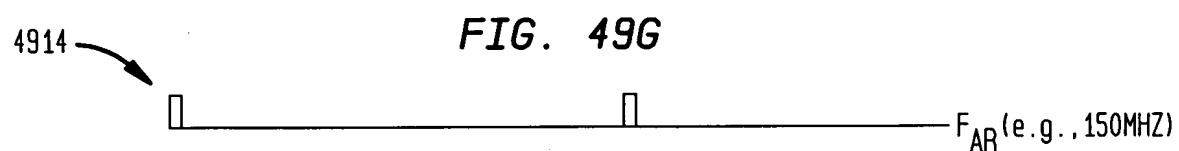
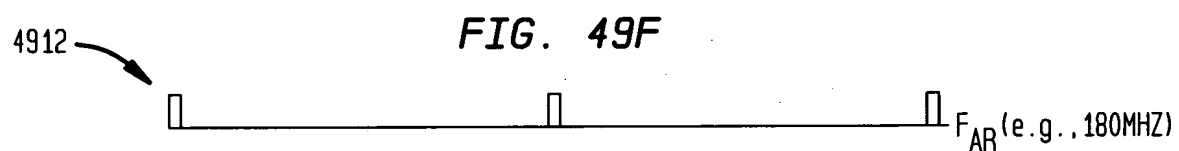
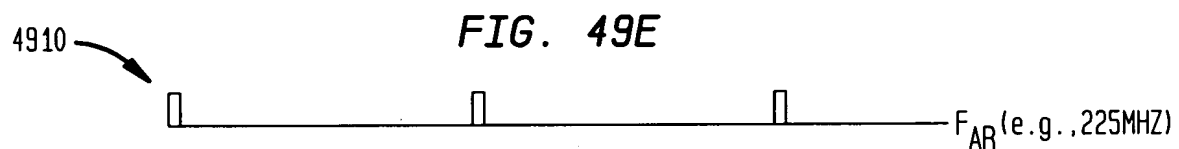
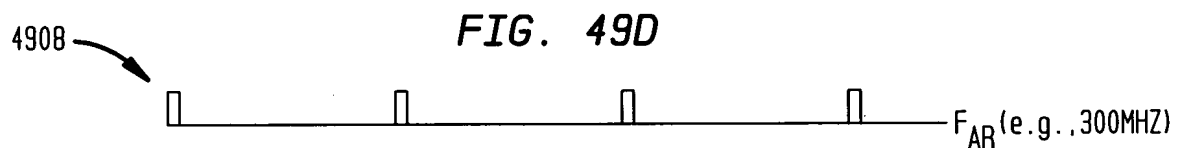
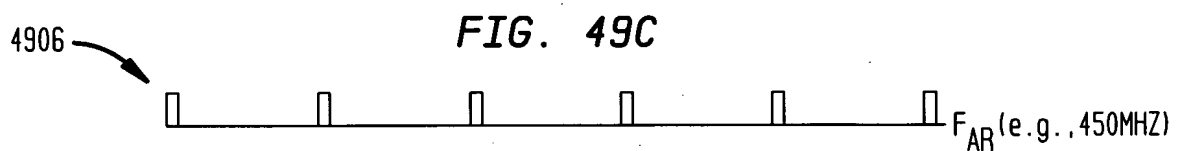
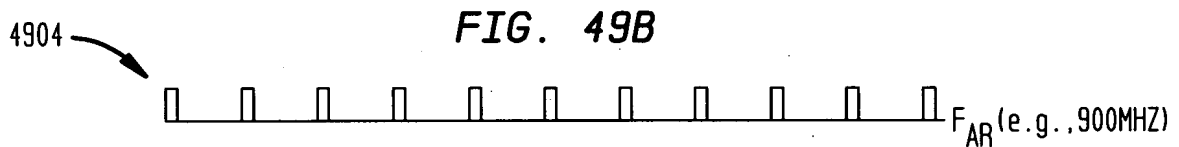


**FIG. 47D**



**FIG. 48**





516  
 (e.g., 901MHZ)

FIG. 50A

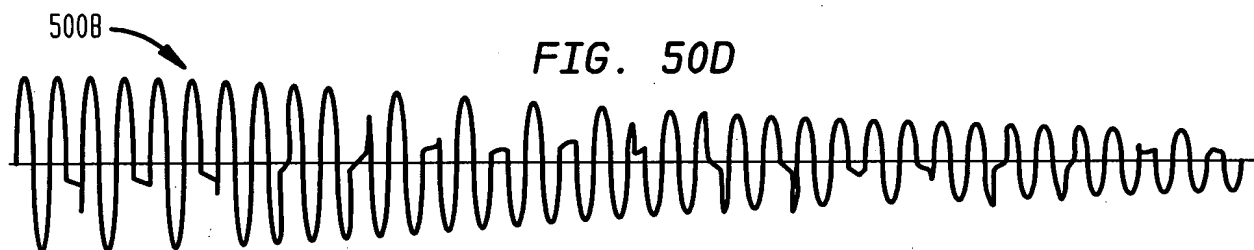
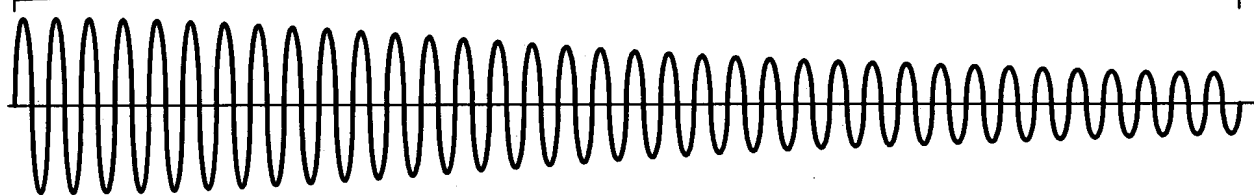
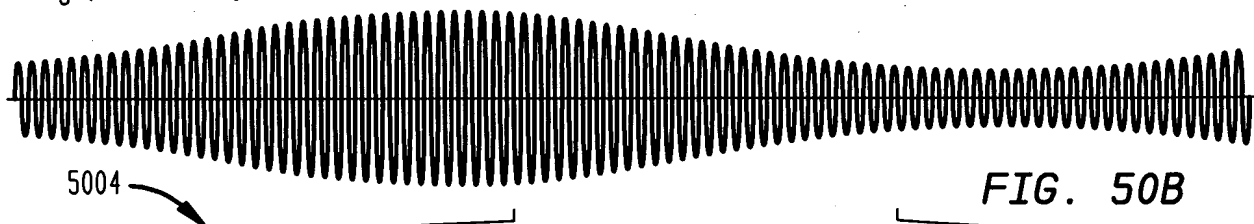


FIG. 50D

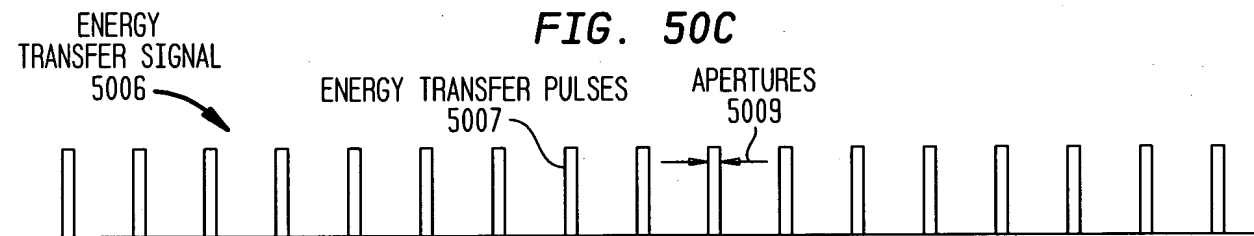


FIG. 50C

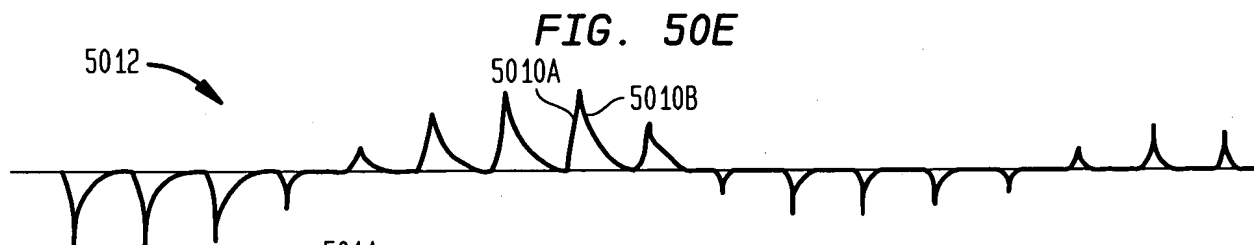


FIG. 50E

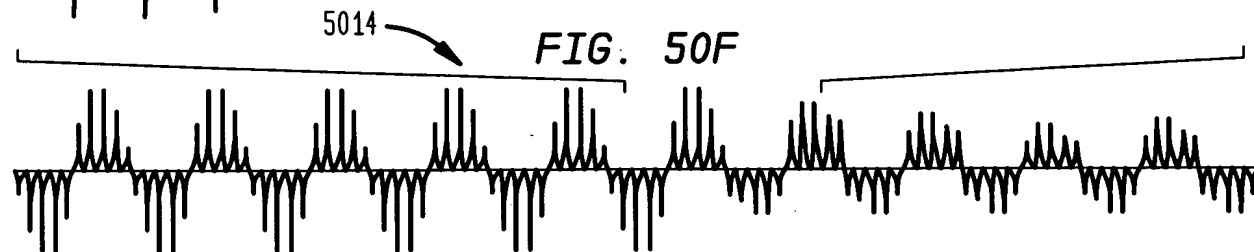


FIG. 50F

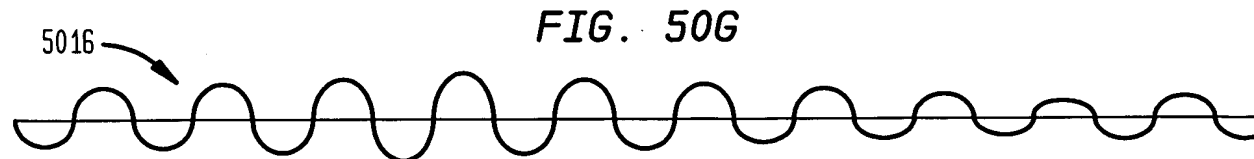
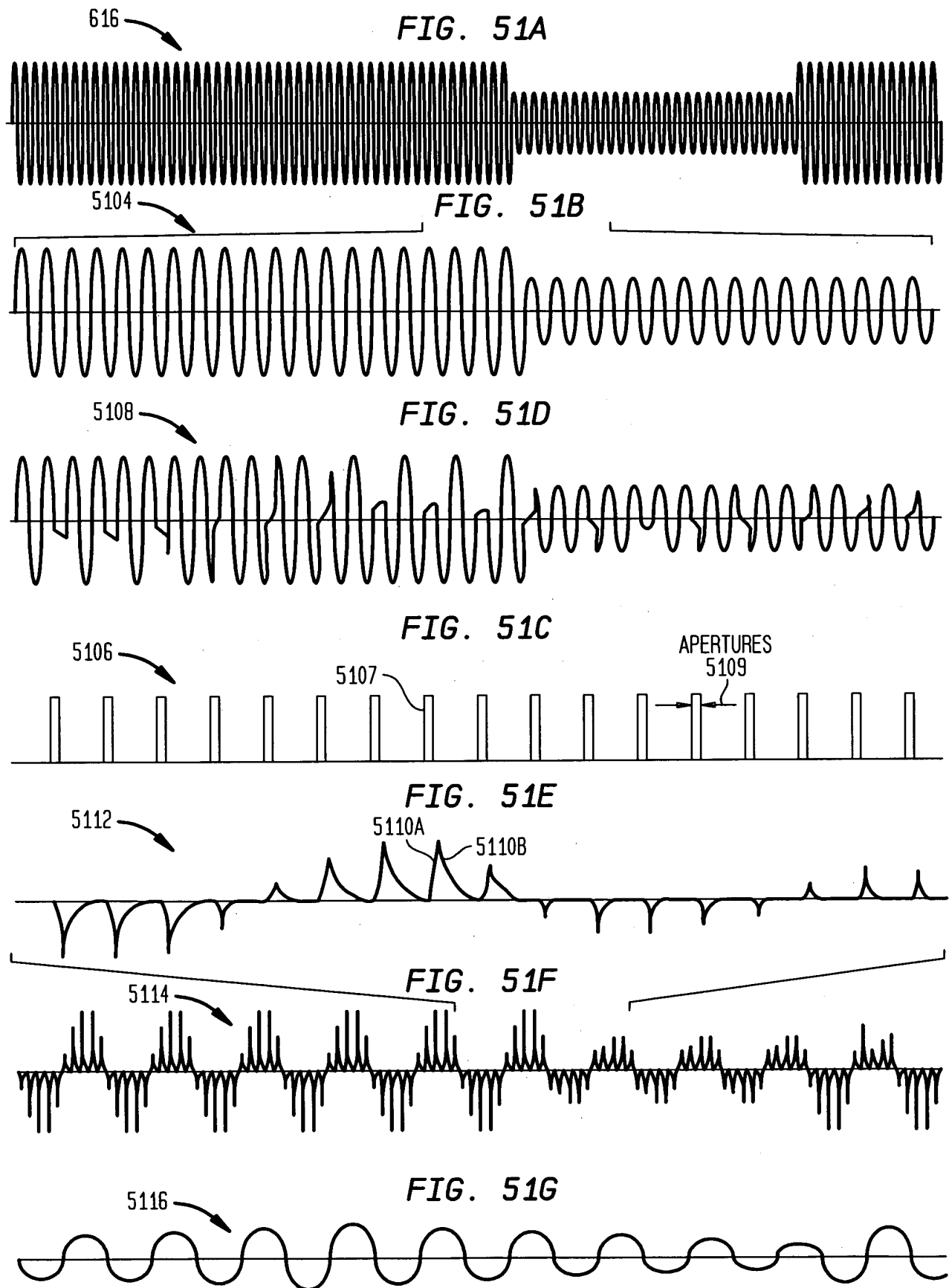
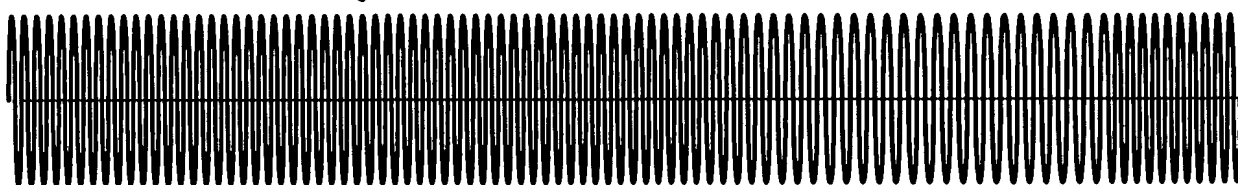


FIG. 50G



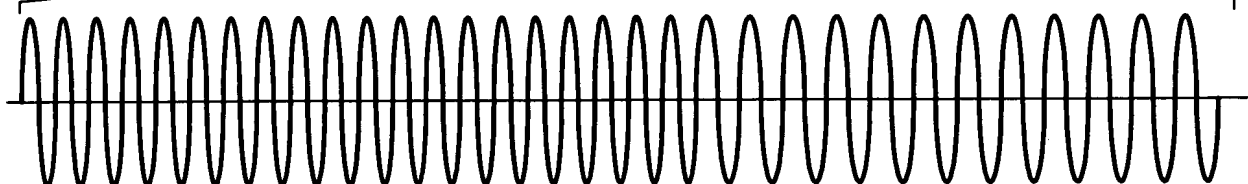
716

FIG. 52A



5204

FIG. 52B



5208

FIG. 52D

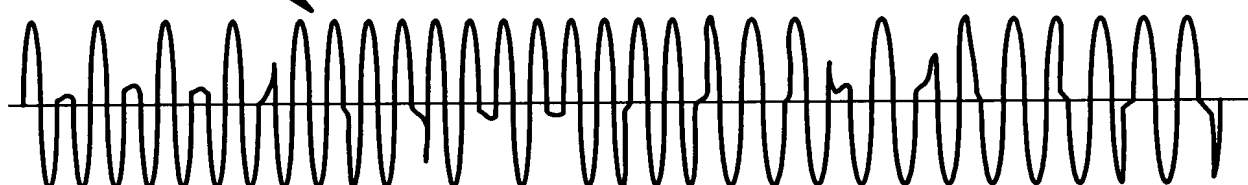


FIG. 52C

5206

APERTURES  
5209

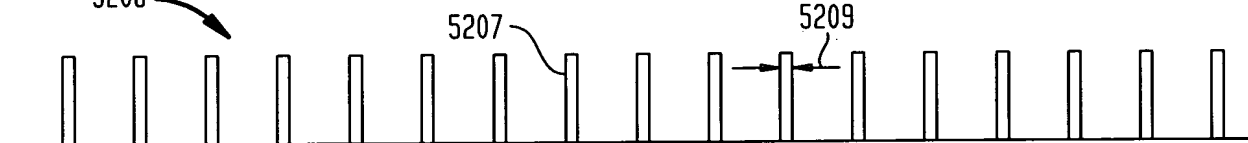


FIG. 52E

5212

5210A

5210B

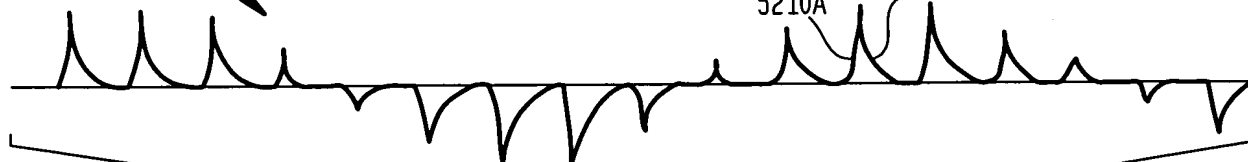
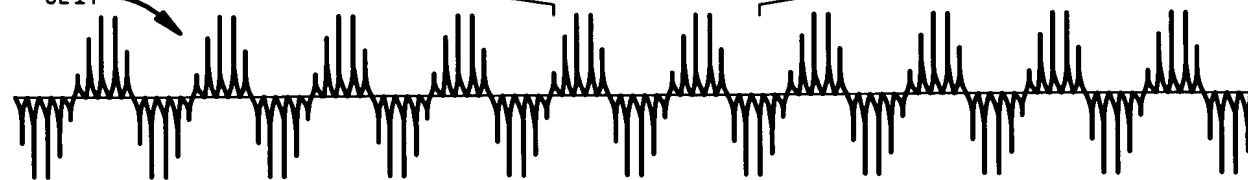


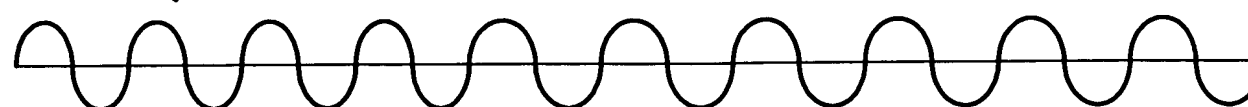
FIG. 52F

5214



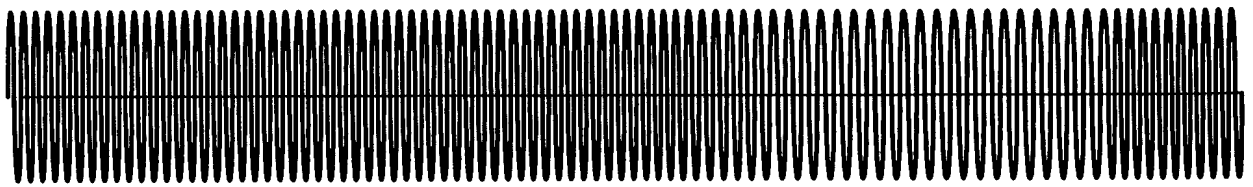
5216

FIG. 52G



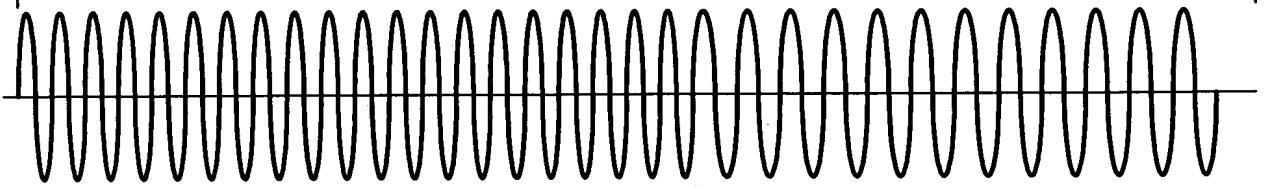
816

FIG. 53A



5304

FIG. 53B



5208

FIG. 53D

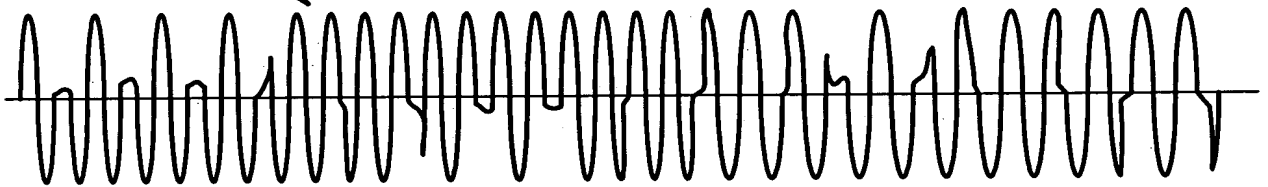


FIG. 53C

5306

5307

APERTURES  
5309

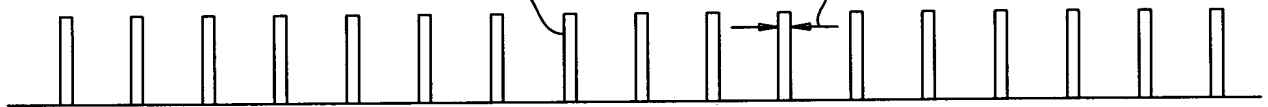


FIG. 53E

5312

5310A

5310B

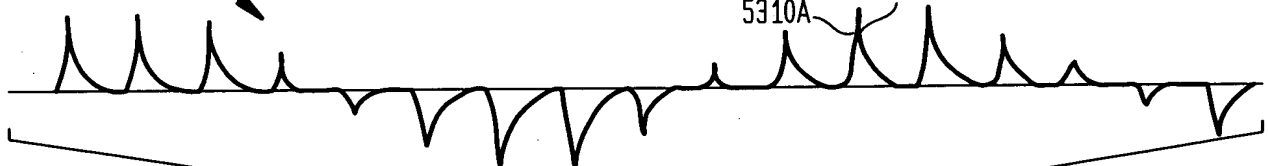


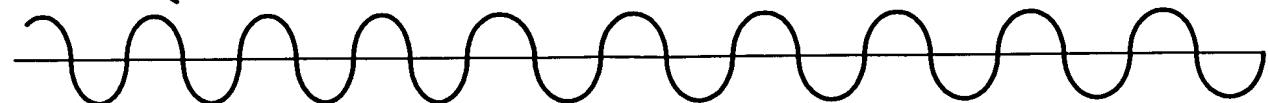
FIG. 53F

5314



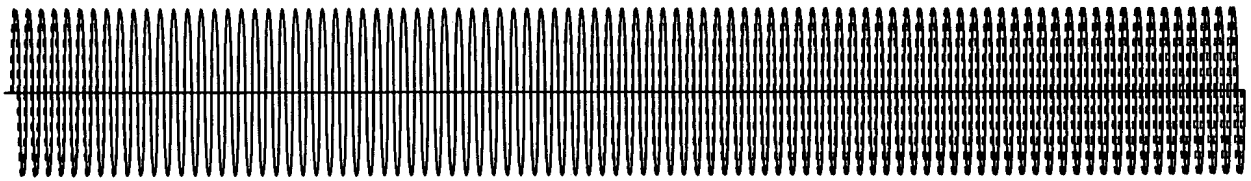
FIG. 53G

5316



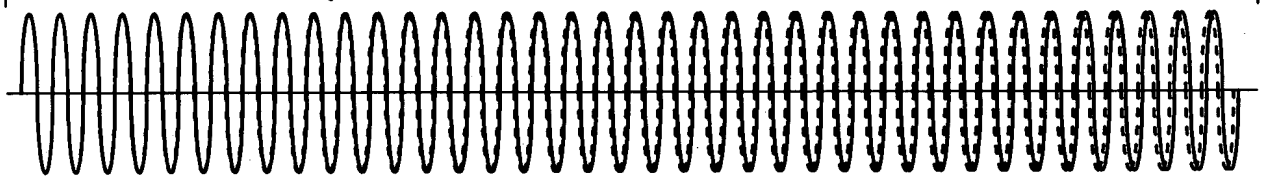
916

FIG. 54A



5404

FIG. 54B



5408

FIG. 54D

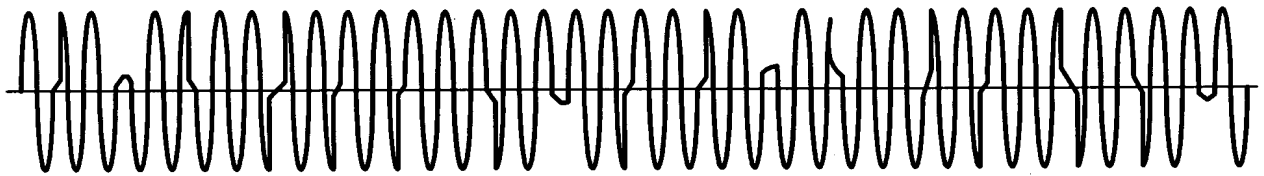


FIG. 54C

5406

5407

APERTURES  
5409

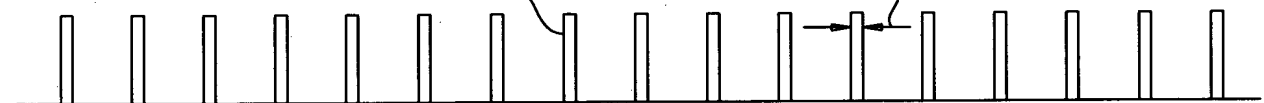


FIG. 54E

5412

5410A 5410B

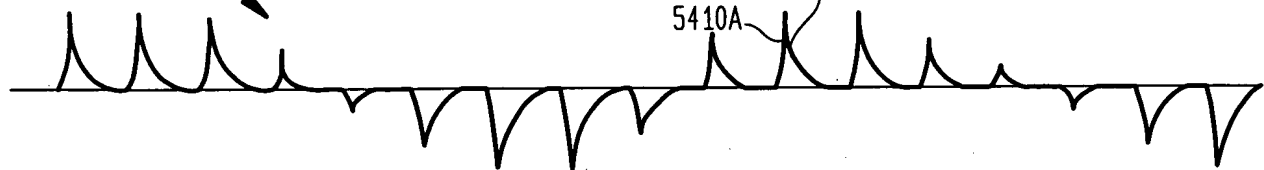


FIG. 54F

5414

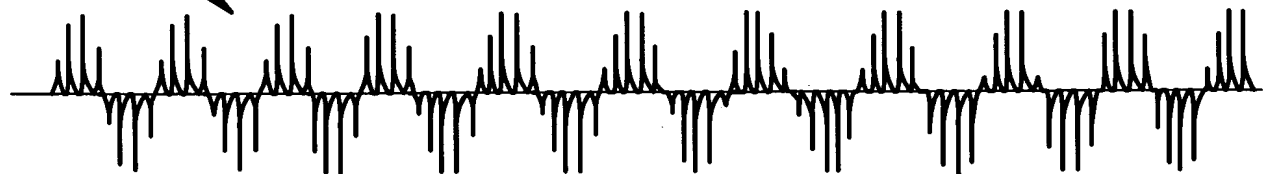


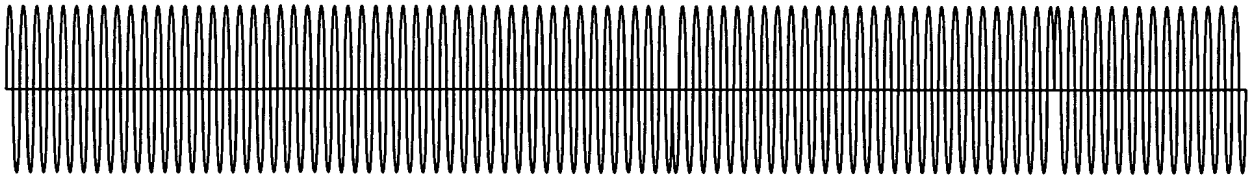
FIG. 54G

5416



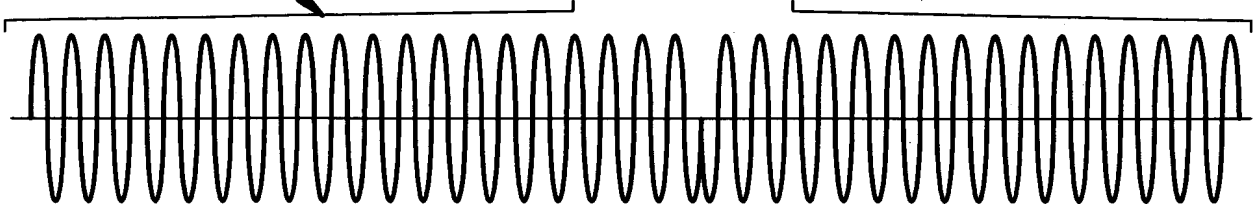
1016

FIG. 55A



5504

FIG. 55B



5508

FIG. 55D

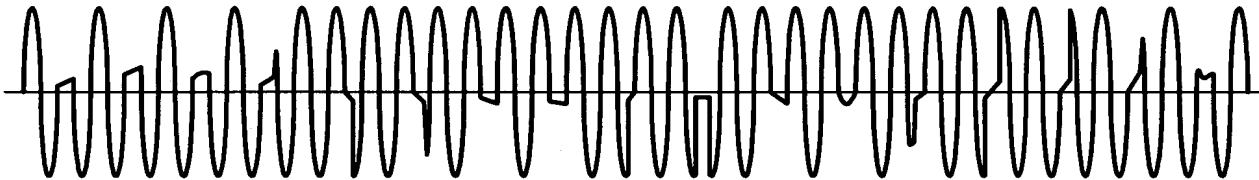
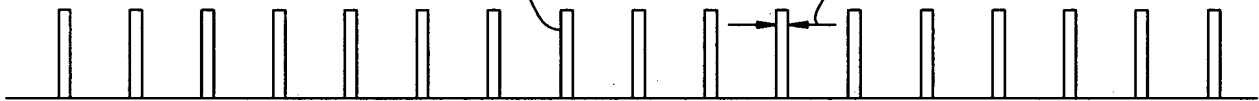


FIG. 55C

5506

5507

APERTURES  
5509



5512

FIG. 55E

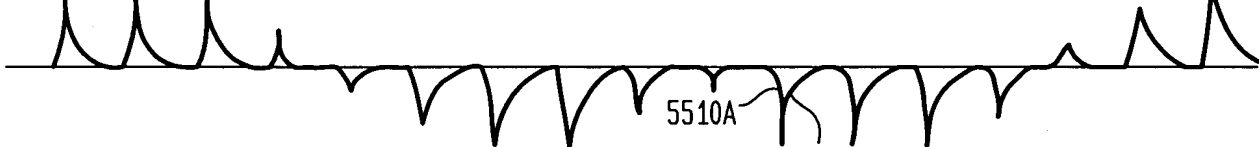
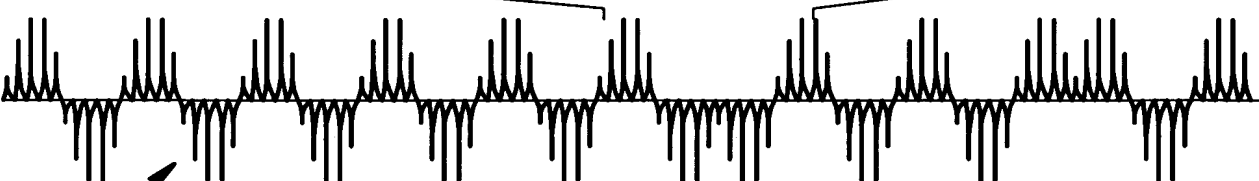
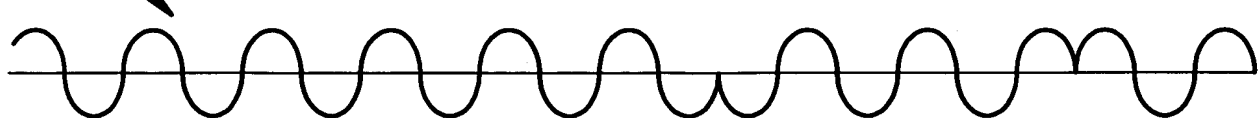


FIG. 55F

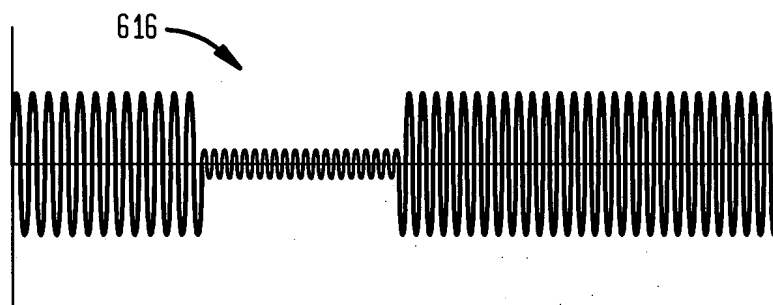


5514

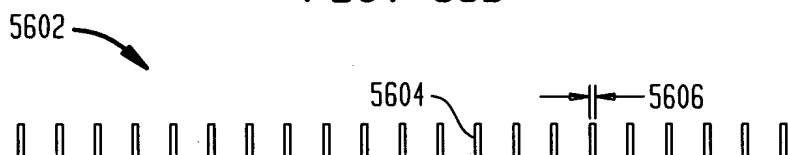
FIG. 55G



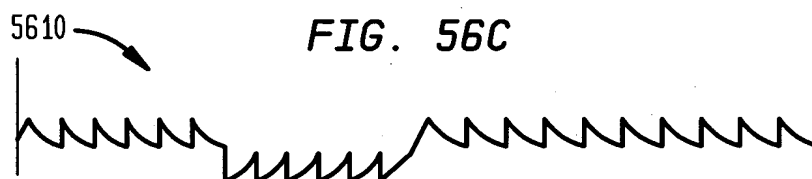
**FIG. 56A**



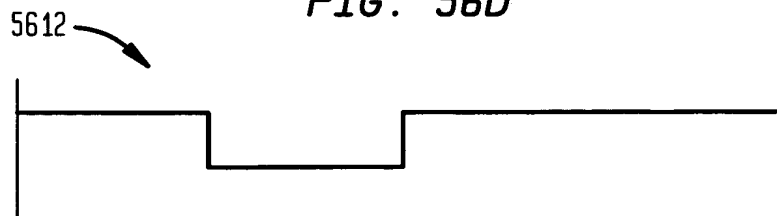
**FIG. 56B**

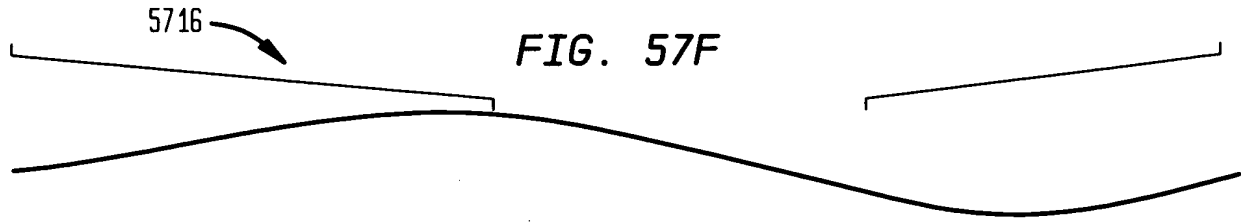
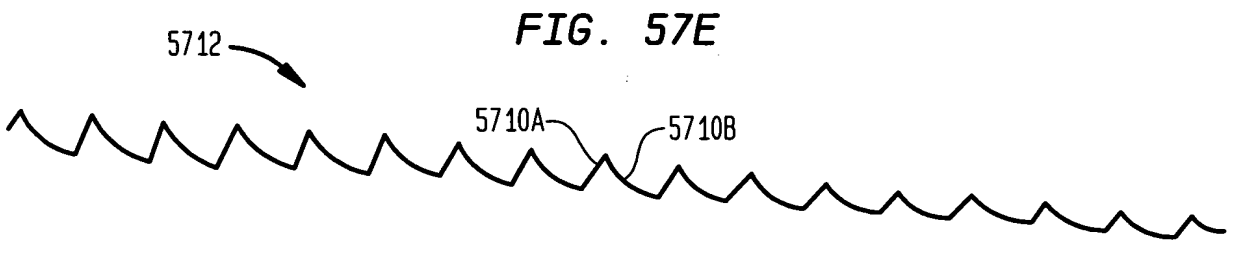
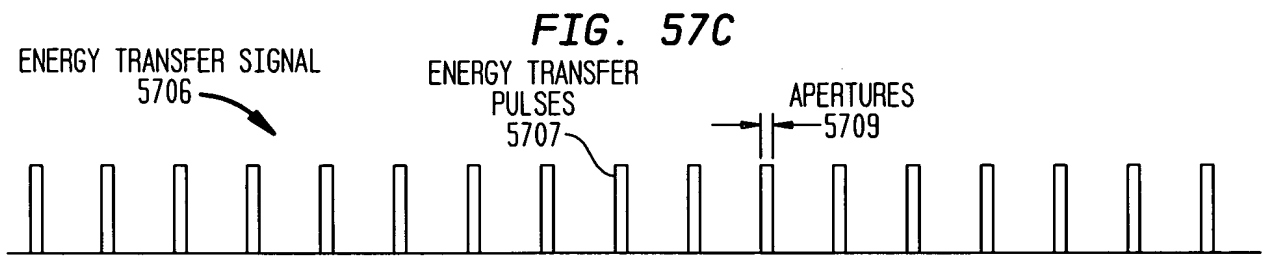
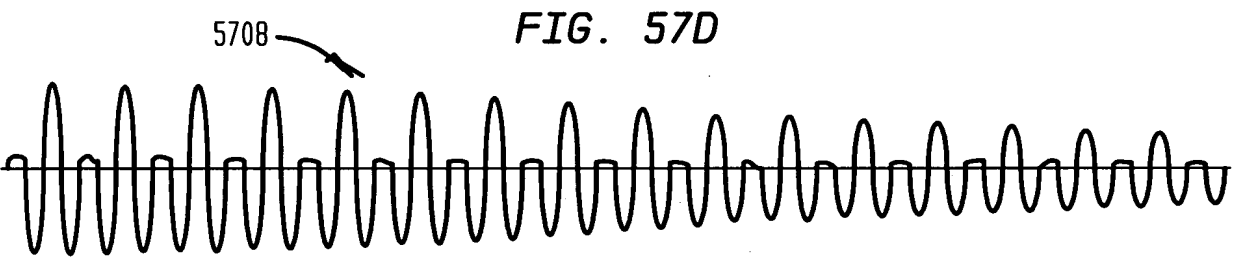
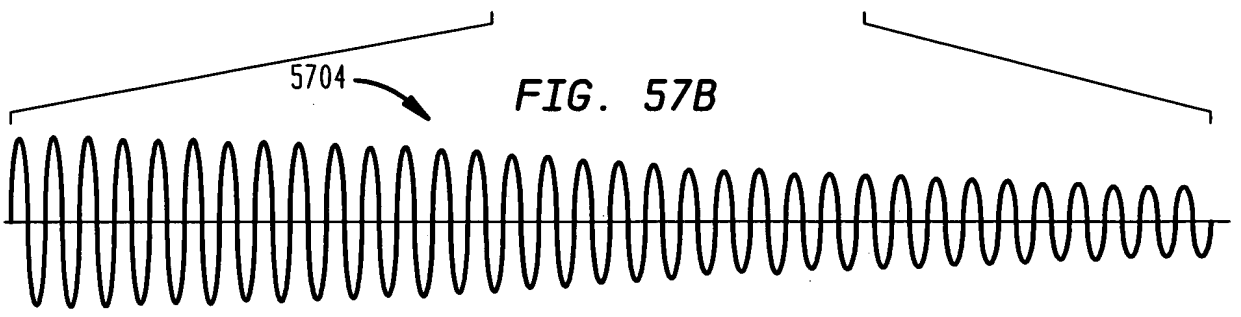
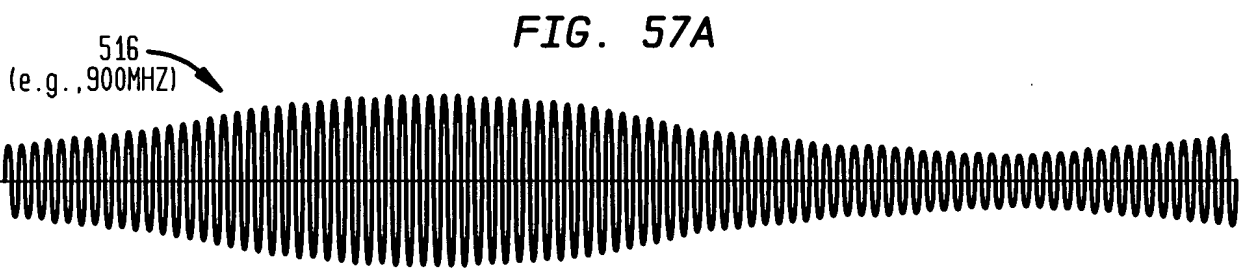


**FIG. 56C**

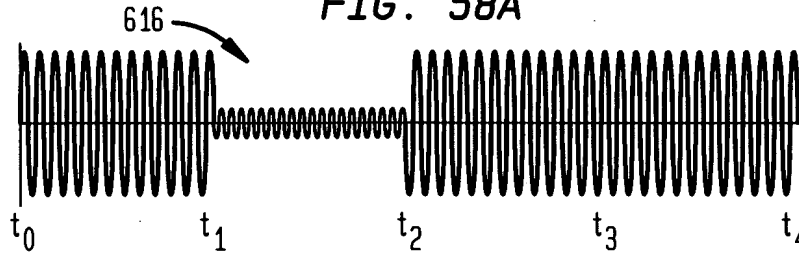


**FIG. 56D**

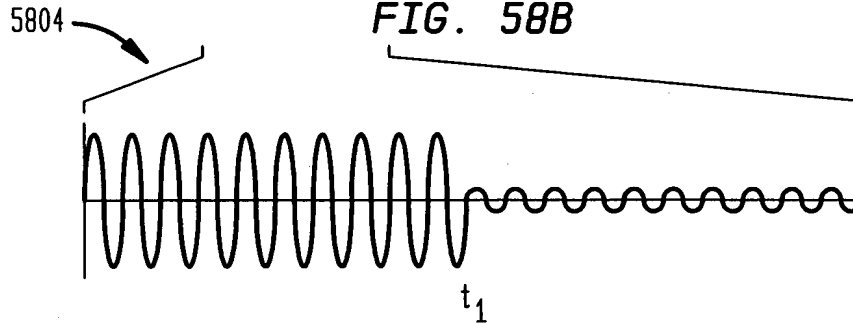




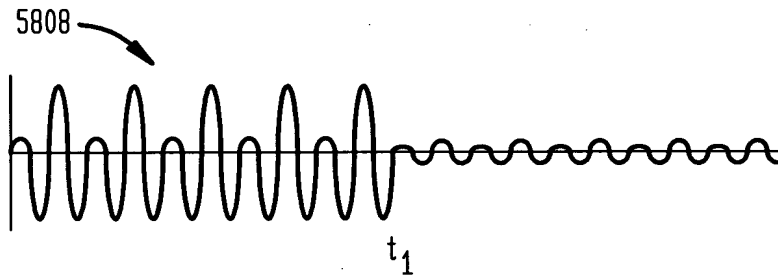
**FIG. 58A**



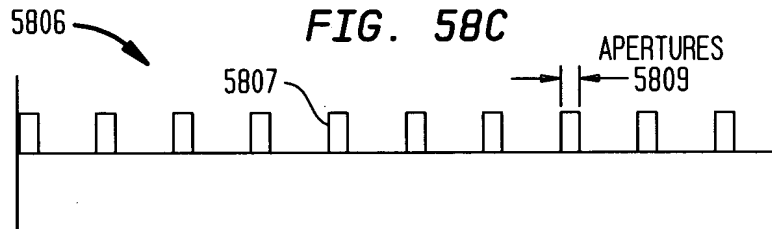
**FIG. 58B**



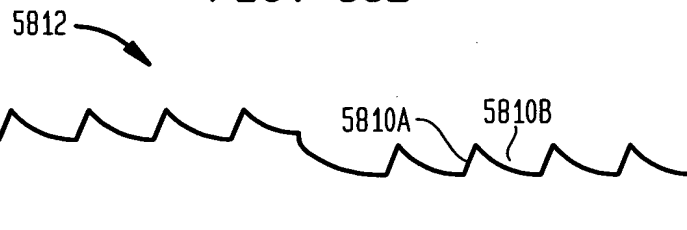
**FIG. 58D**



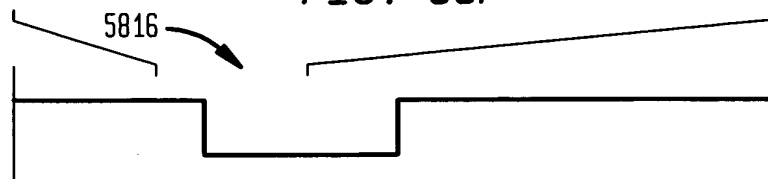
**FIG. 58C**

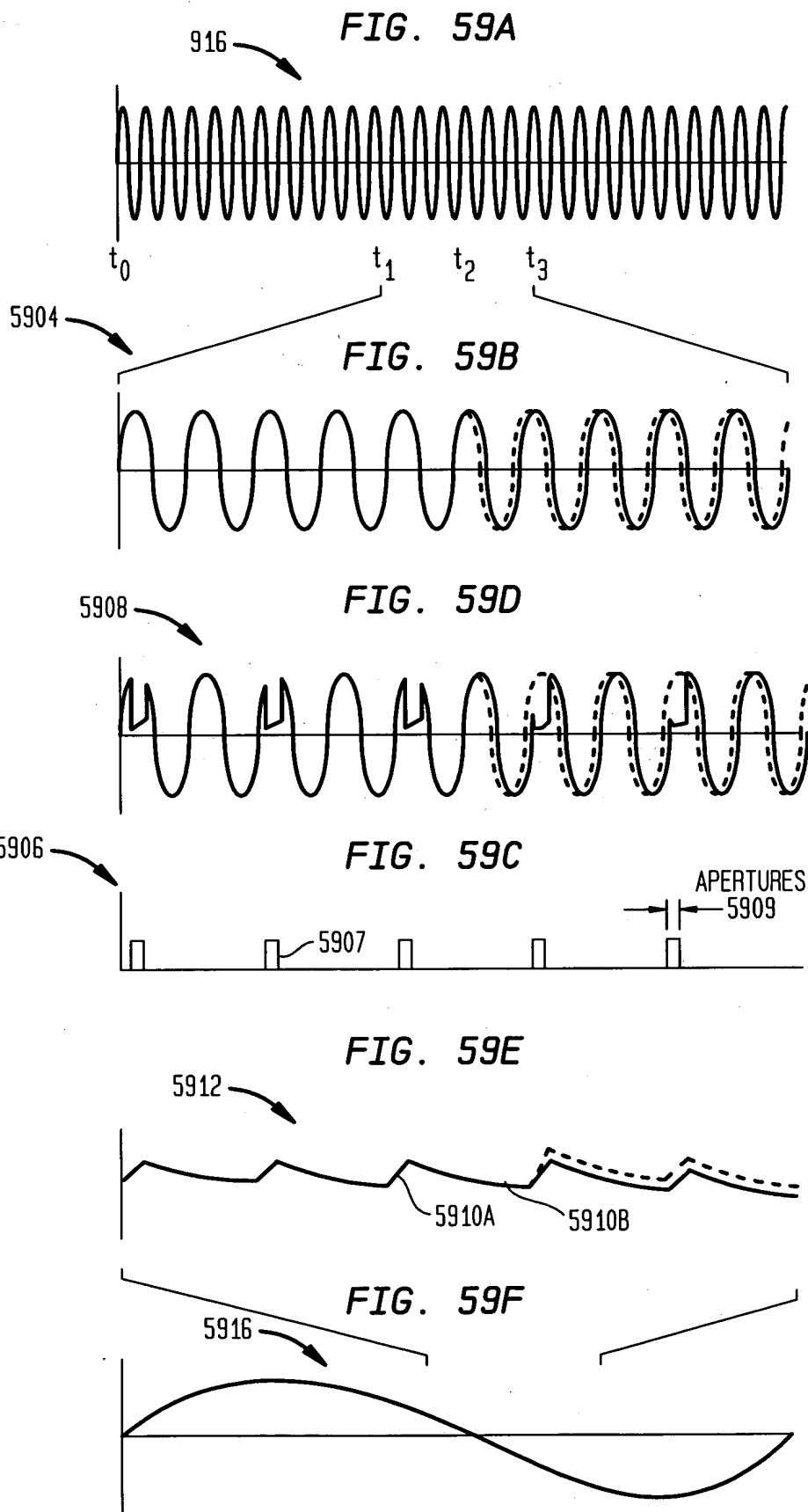


**FIG. 58E**



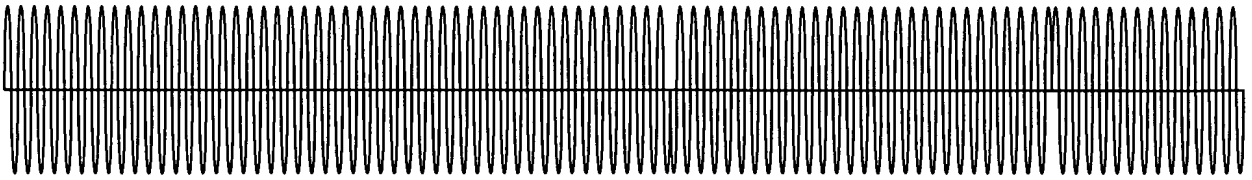
**FIG. 58F**





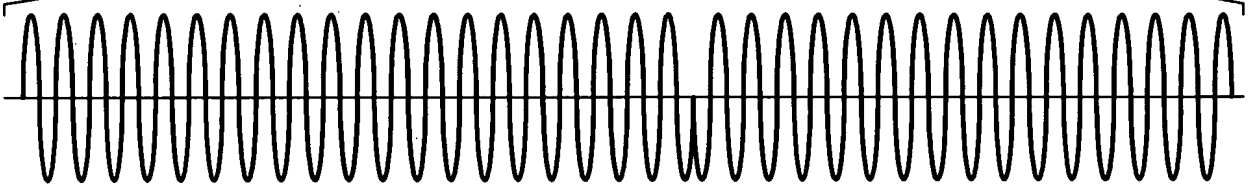
1016

FIG. 60A



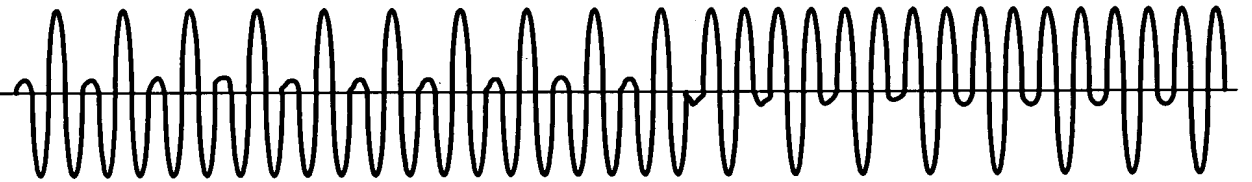
6004

FIG. 60B



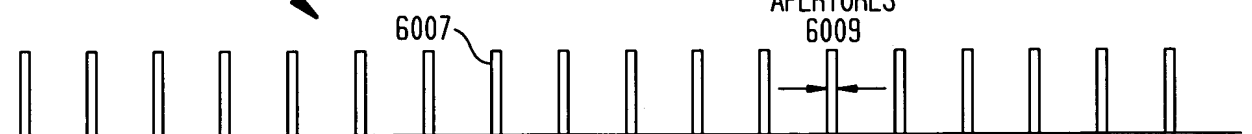
6008

FIG. 60D



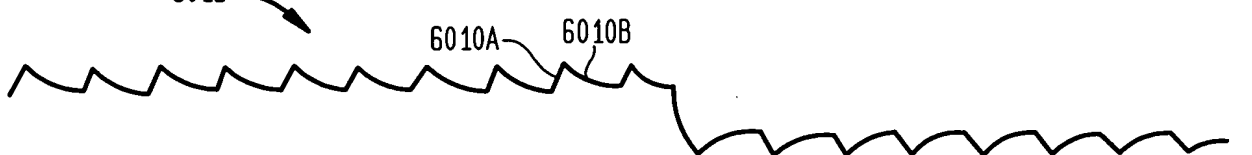
6006

FIG. 60C



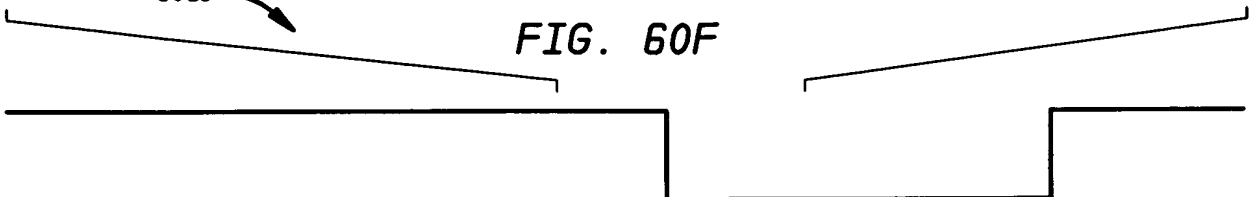
6012

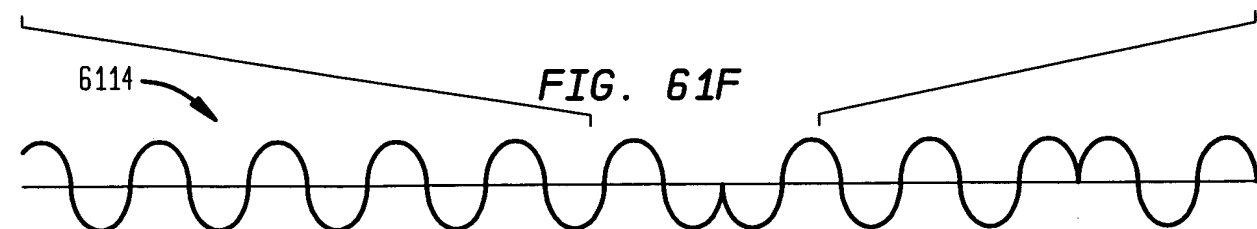
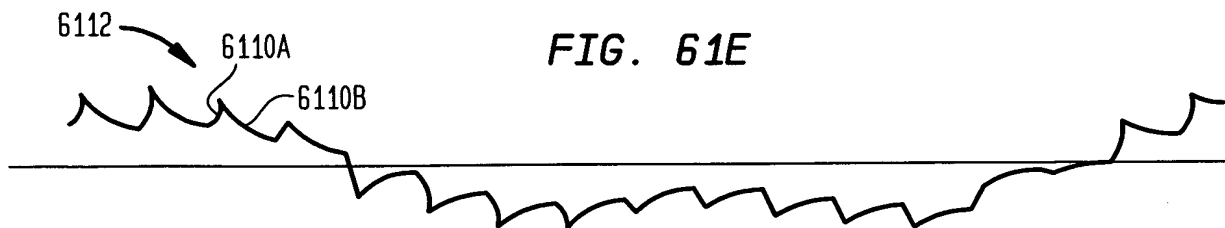
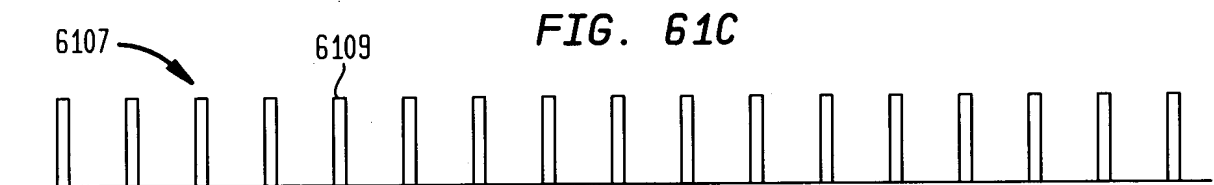
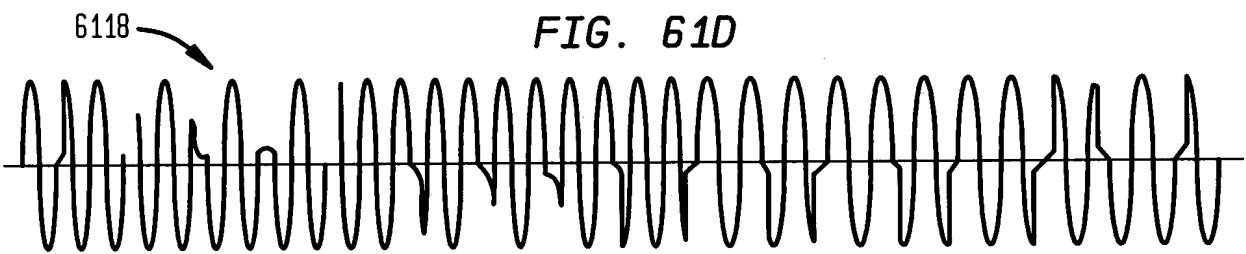
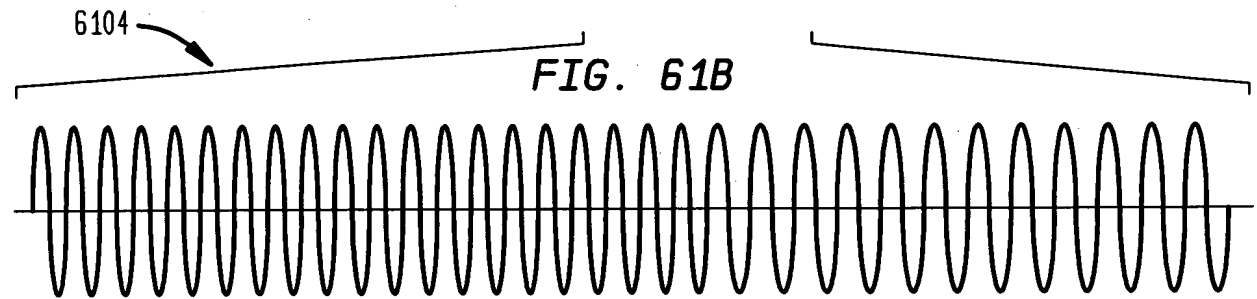
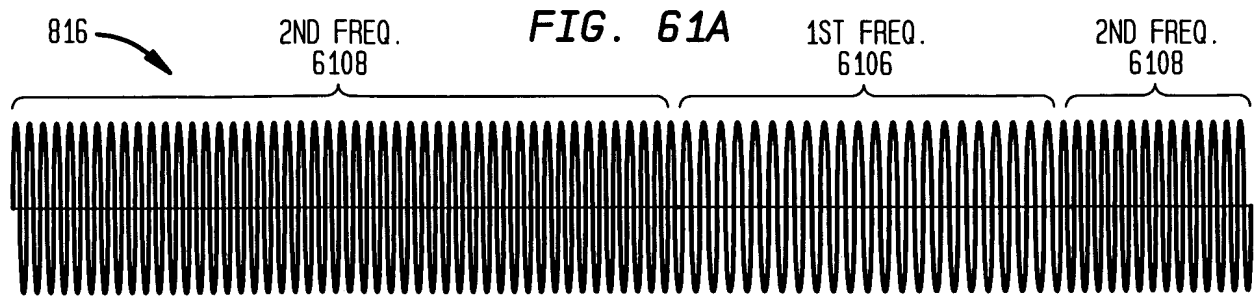
FIG. 60E

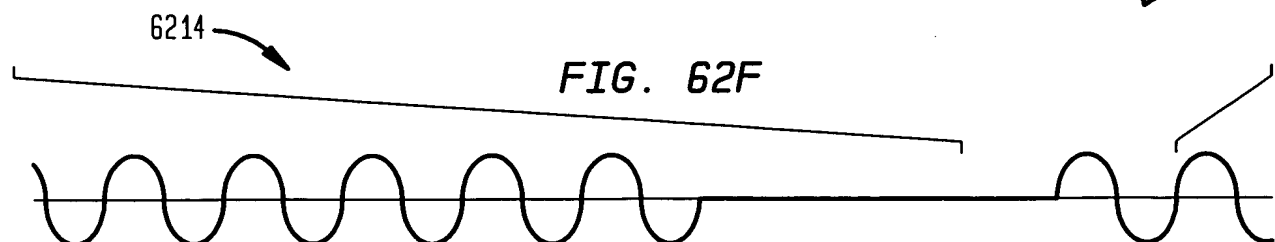
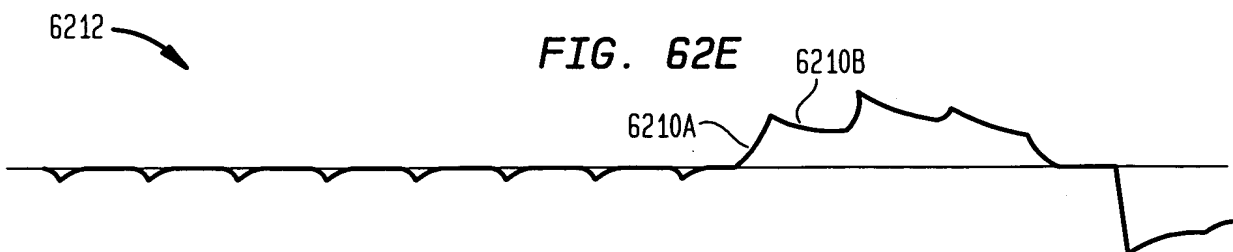
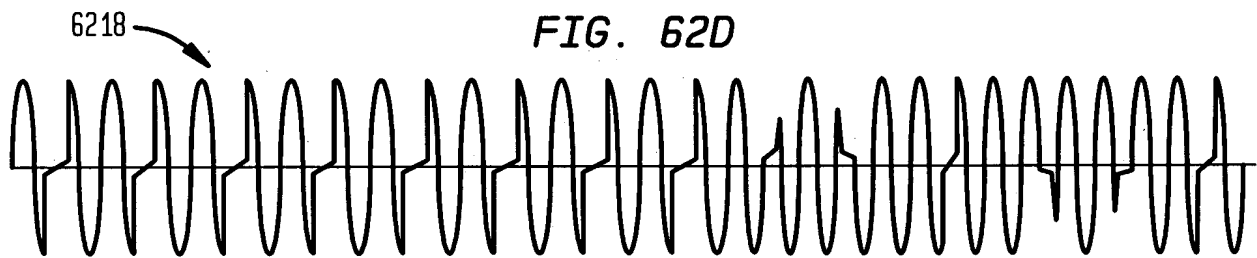
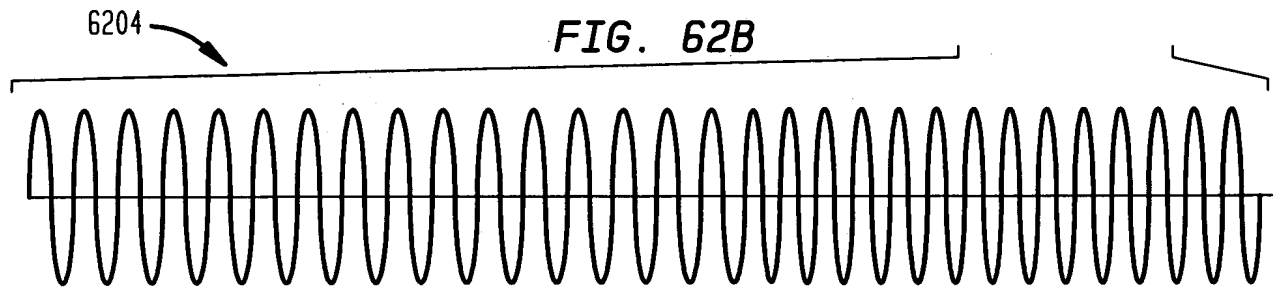
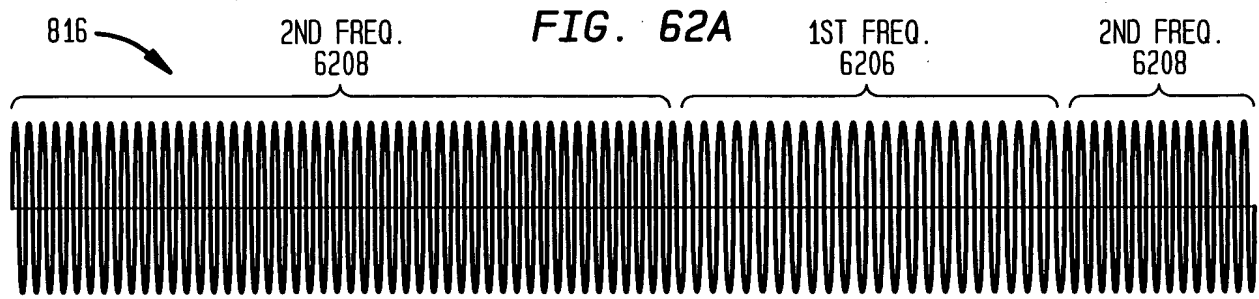


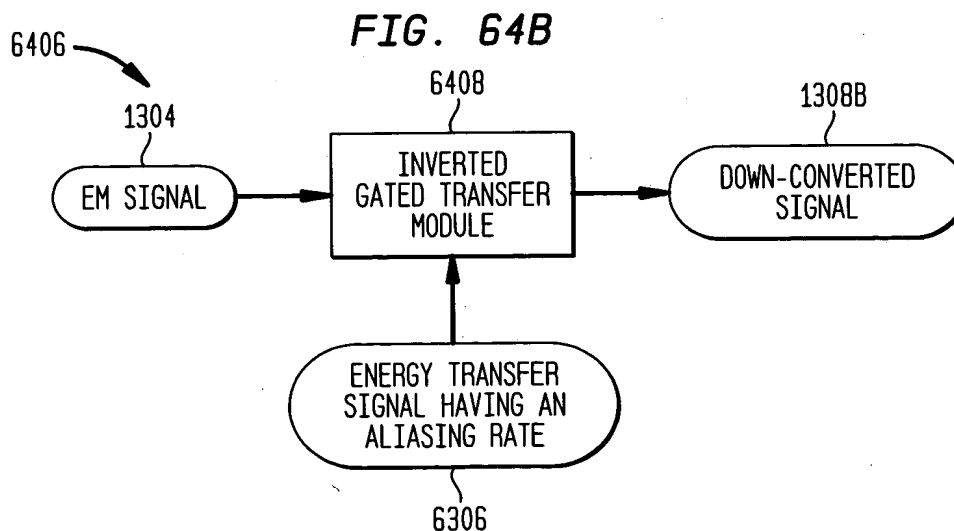
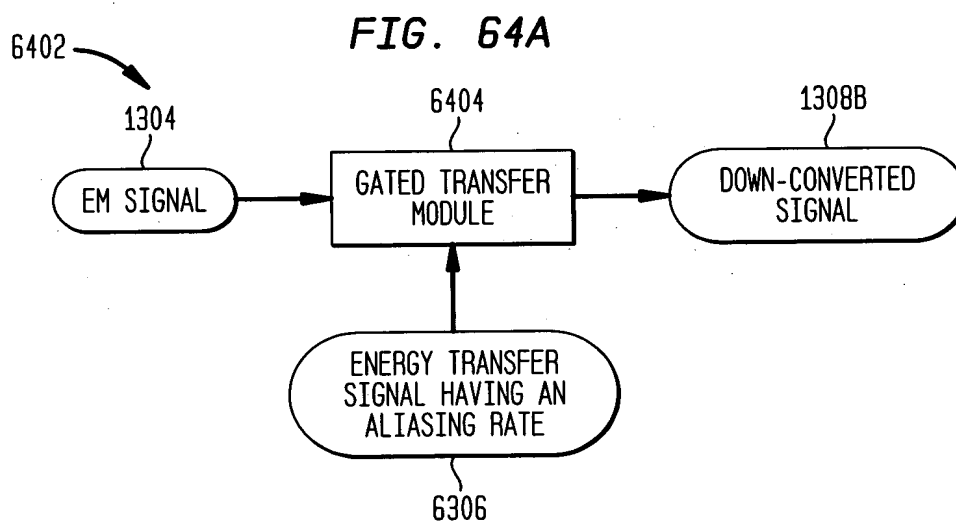
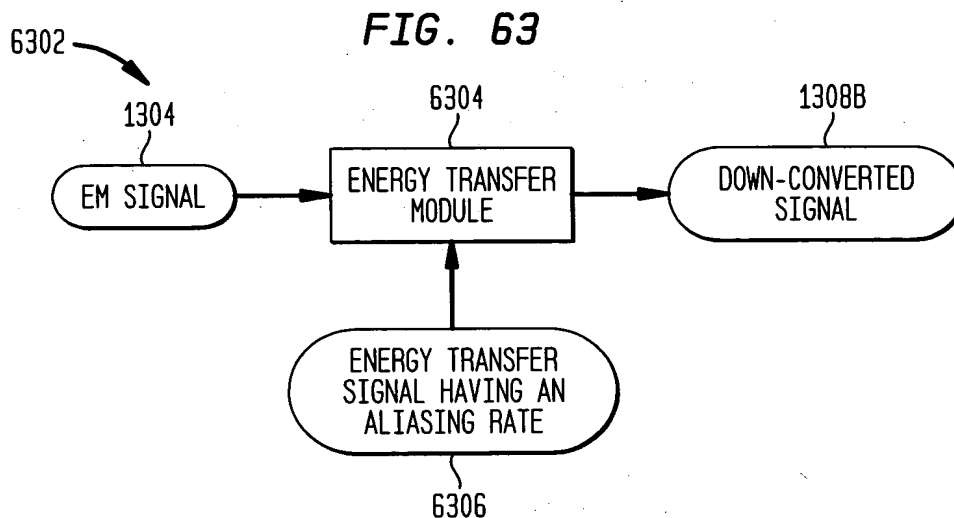
6016

FIG. 60F

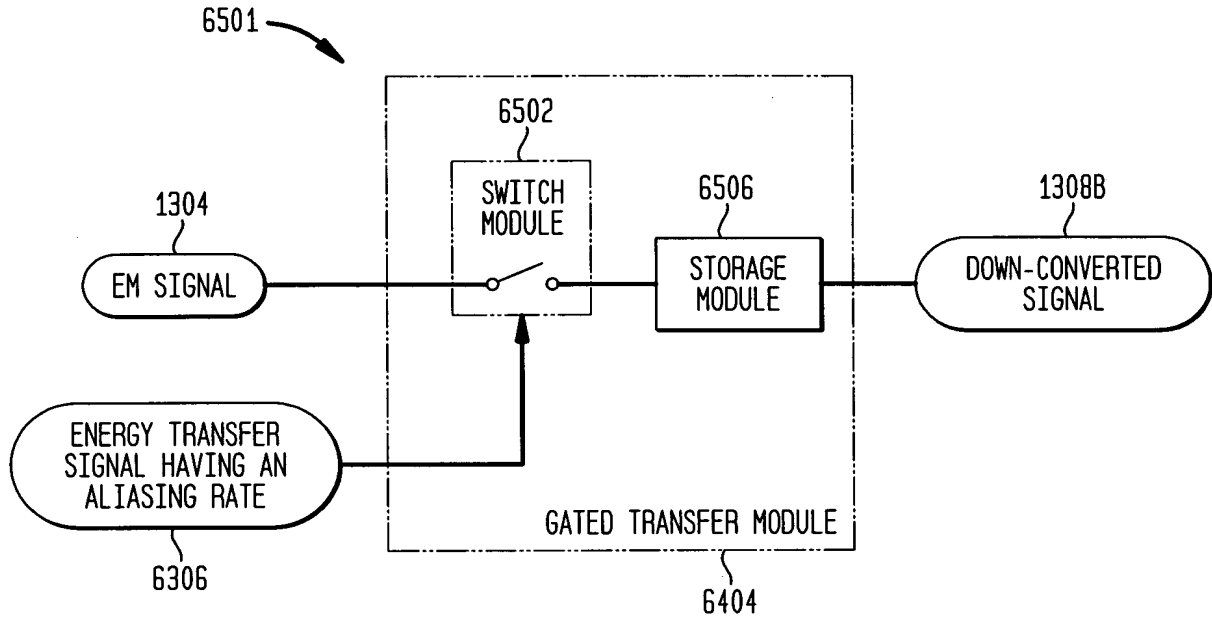




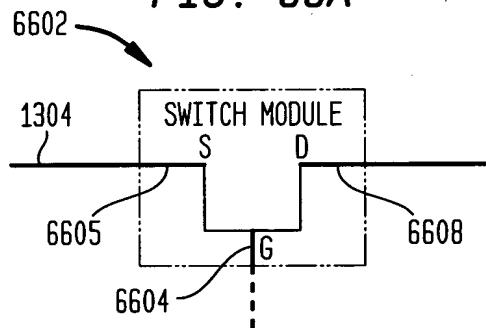




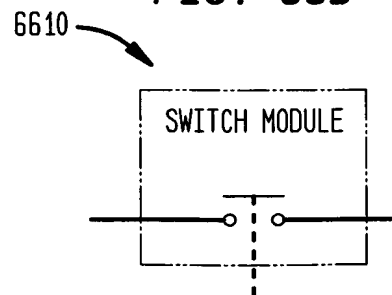
**FIG. 65**



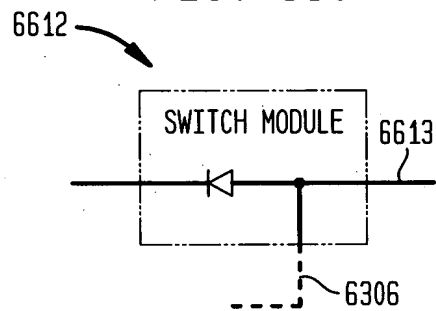
**FIG. 66A**



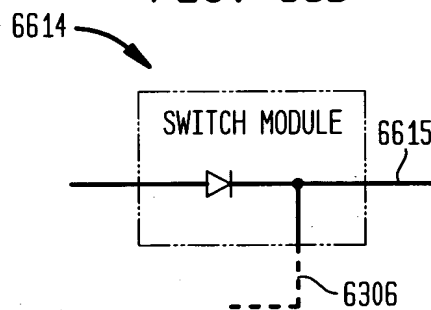
**FIG. 66B**

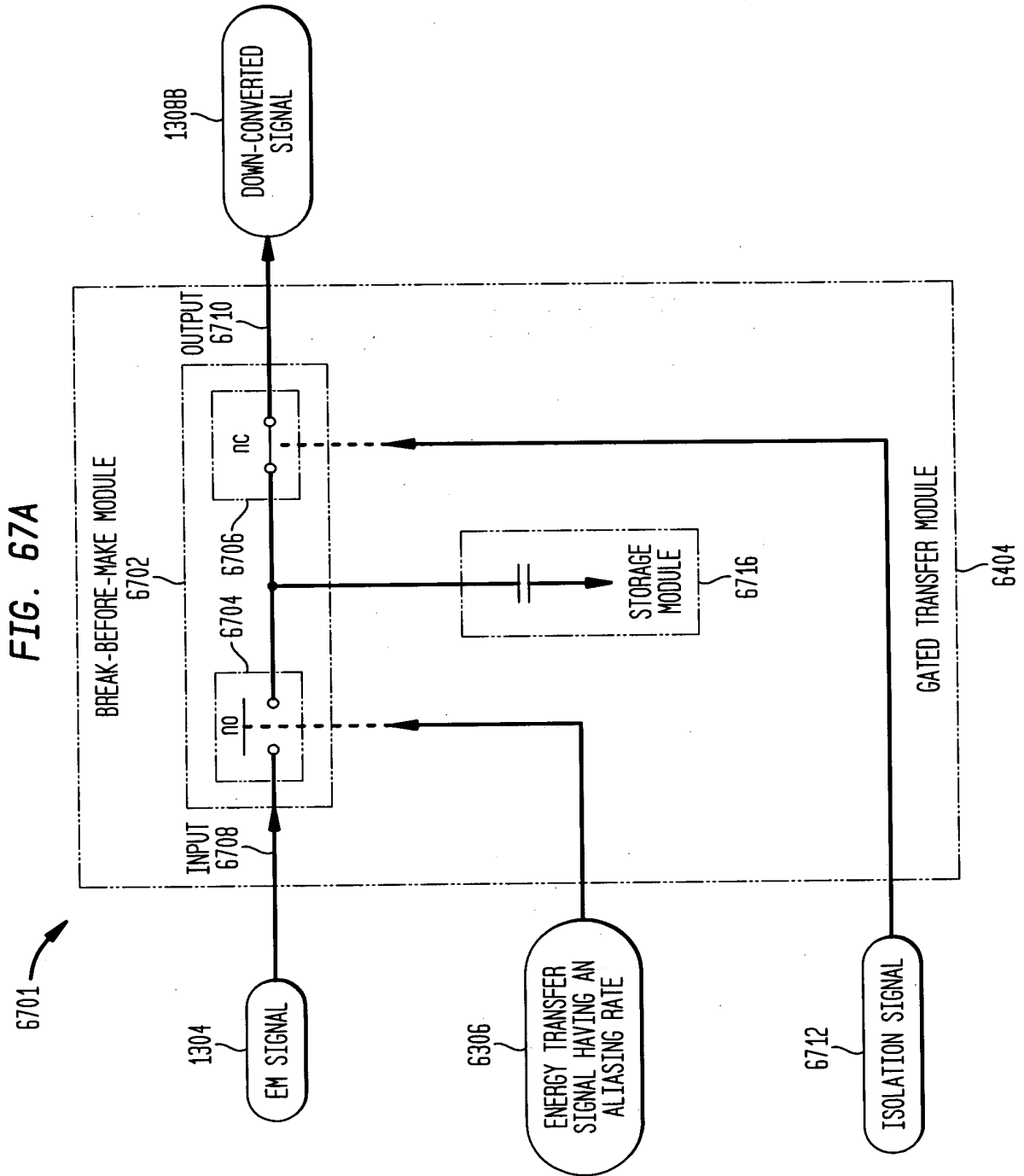


**FIG. 66C**

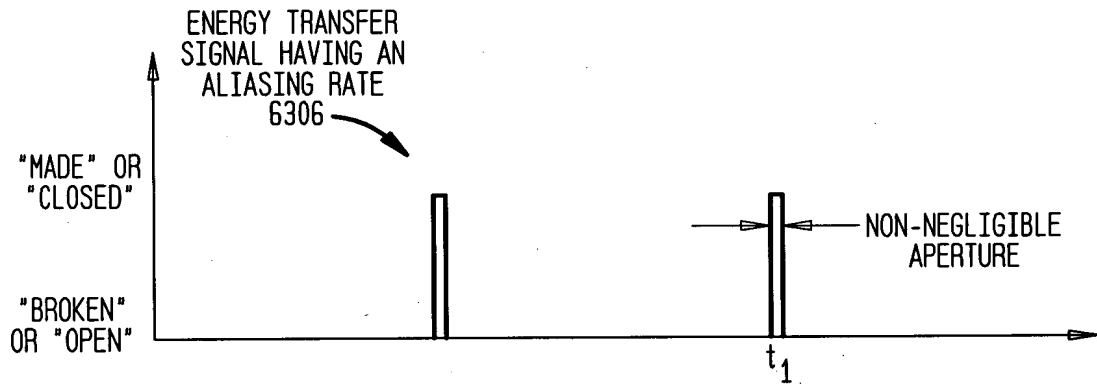


**FIG. 66D**

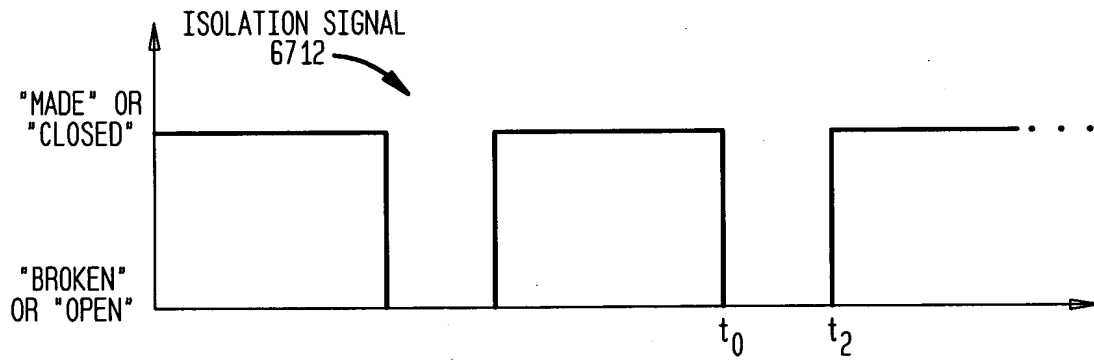




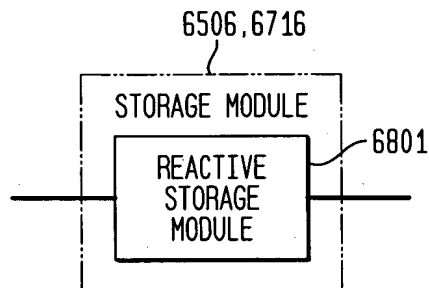
**FIG. 67B**



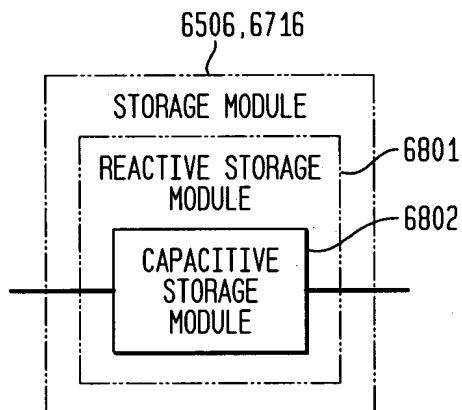
**FIG. 67C**



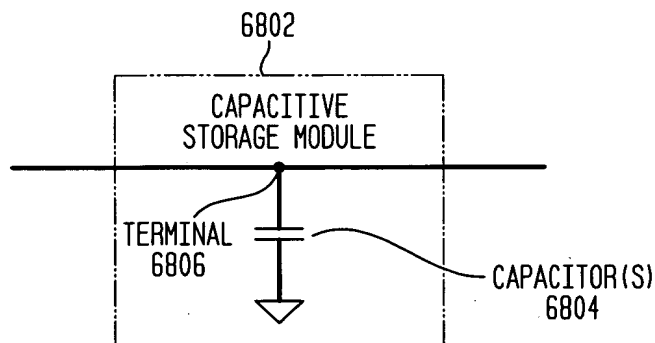
**FIG. 68A**



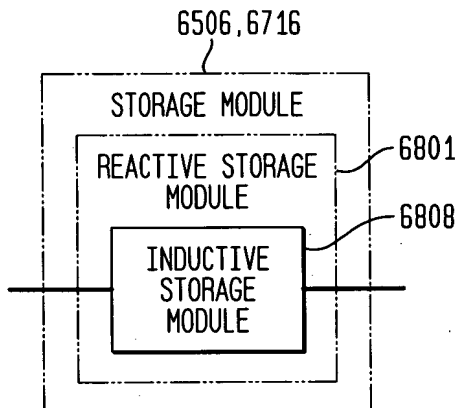
**FIG. 68B**



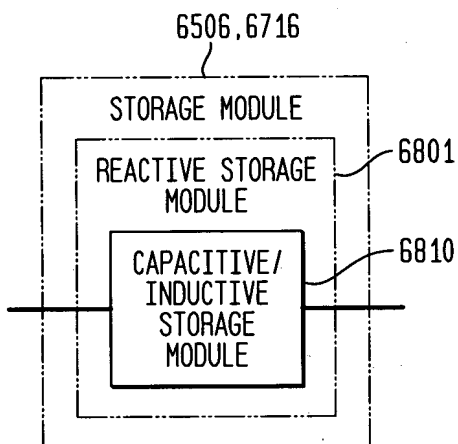
**FIG. 68C**



**FIG. 68D**



**FIG. 68E**



**FIG. 68F**

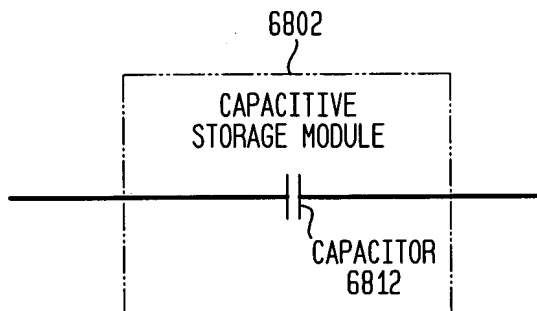
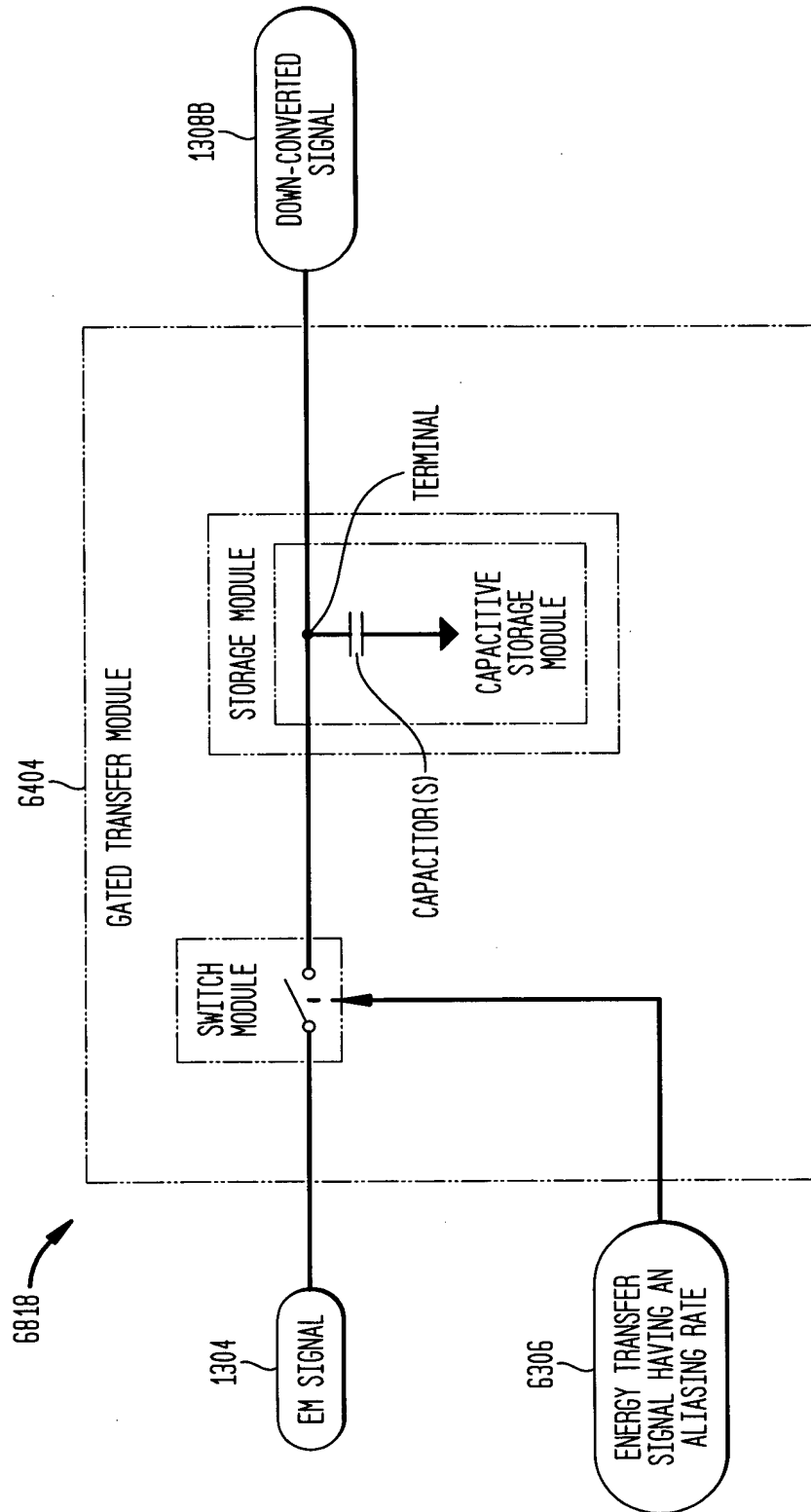
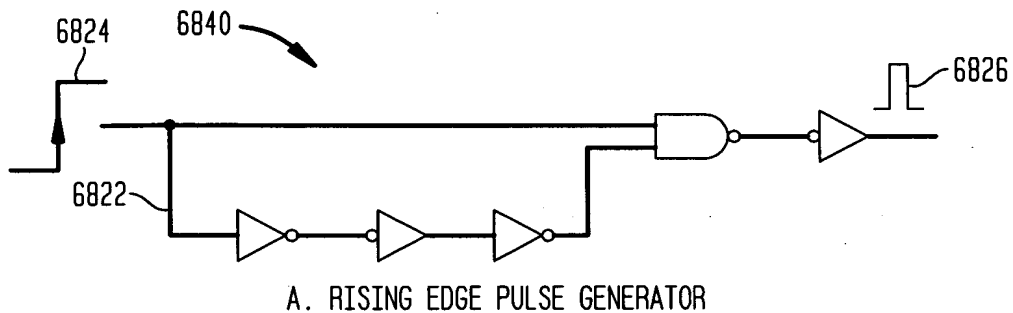


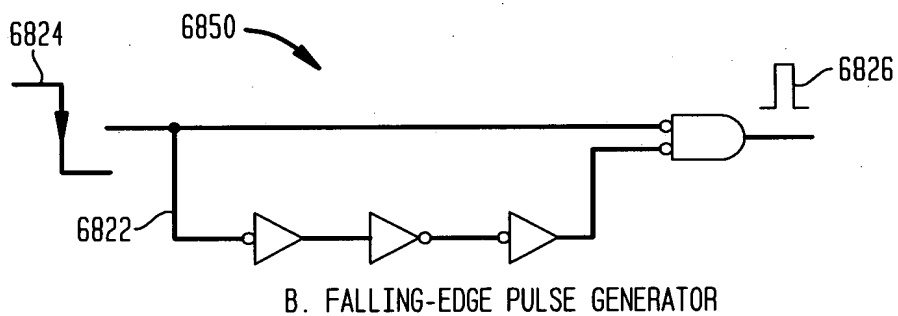
FIG. 68G



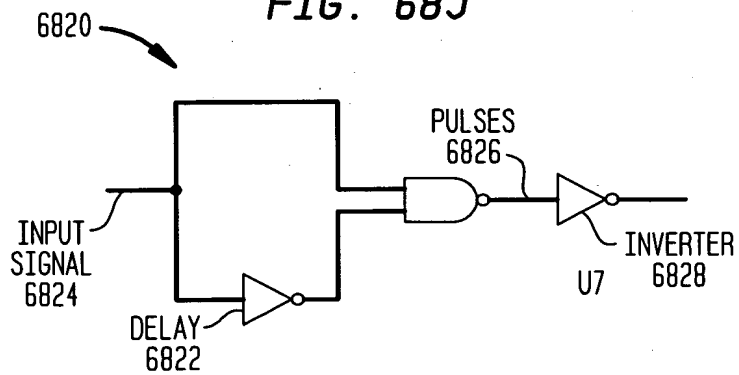
**FIG. 68H**



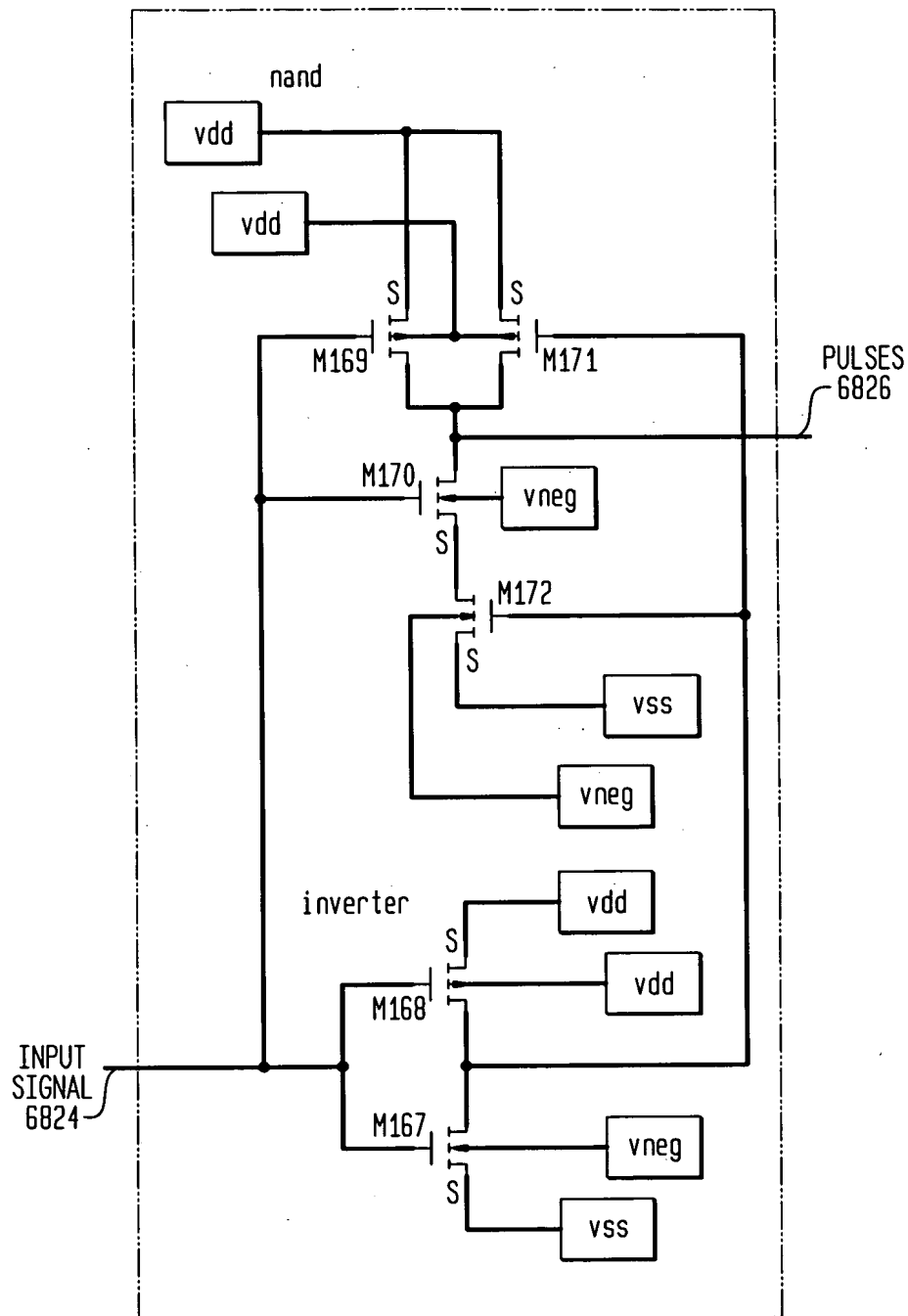
**FIG. 68I**



**FIG. 68J**



**FIG. 68K**



**FIG. 68L**

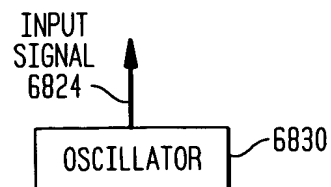
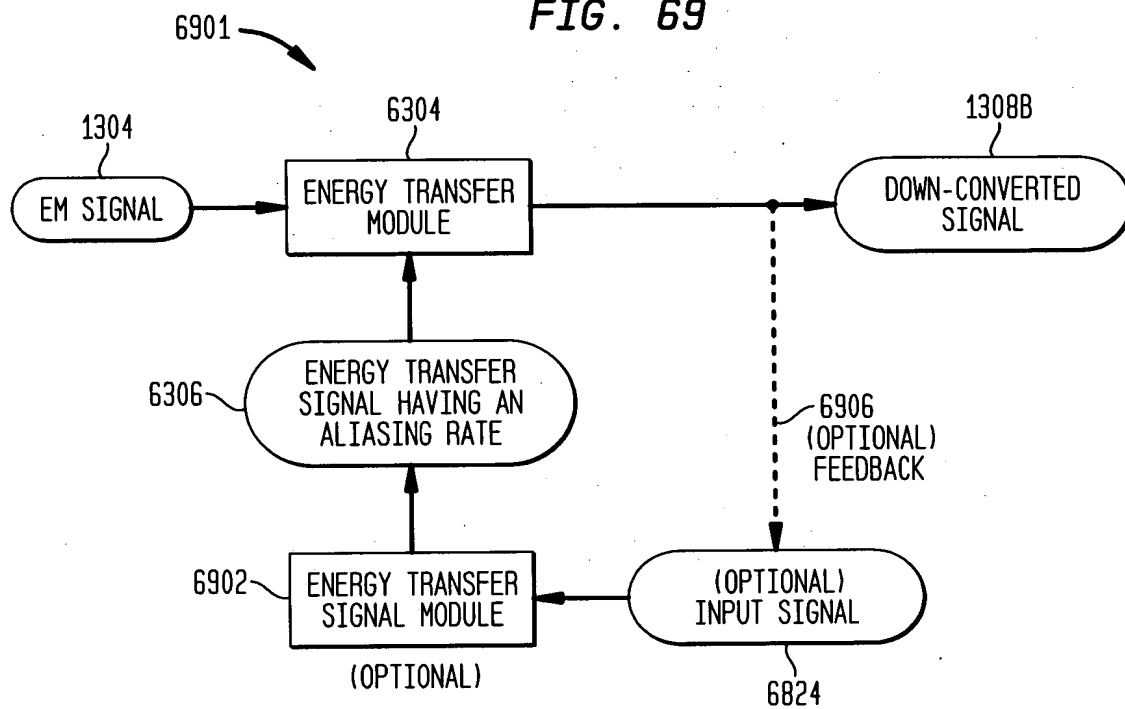
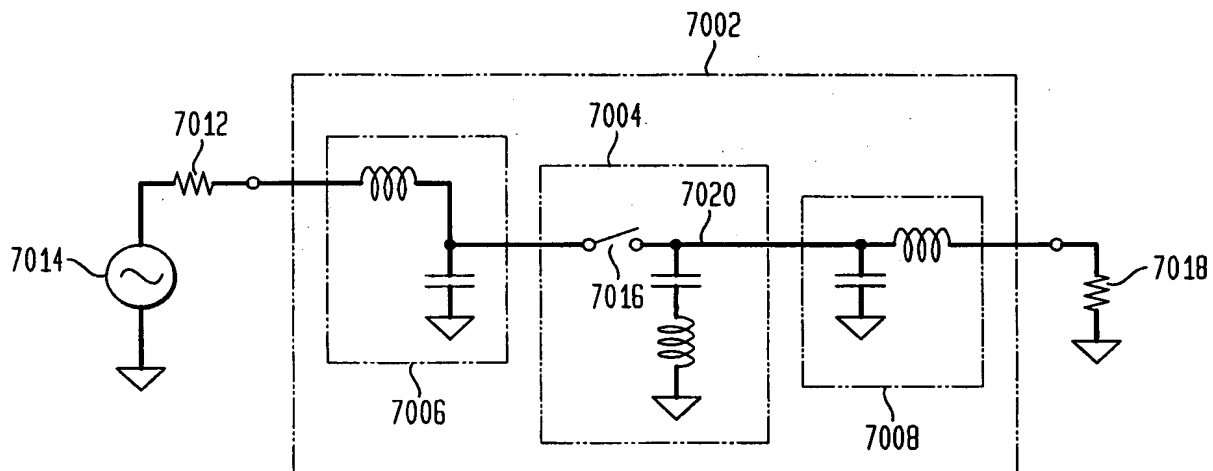


FIG. 69



**FIG. 70**

IMPEDANCE MATCHED ALIASING MODULE



**FIG. 71A**

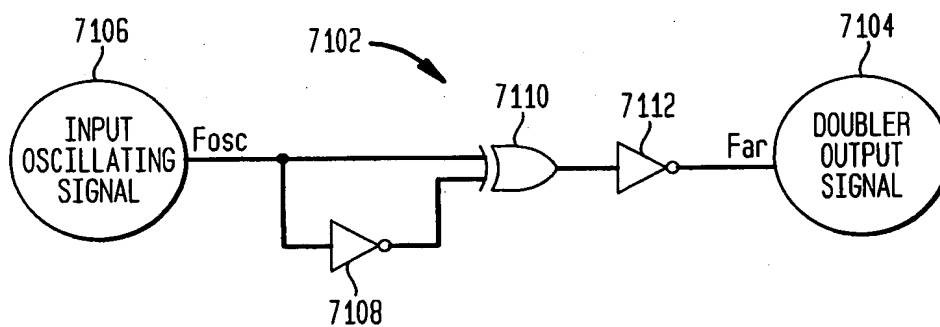


FIG. 71B

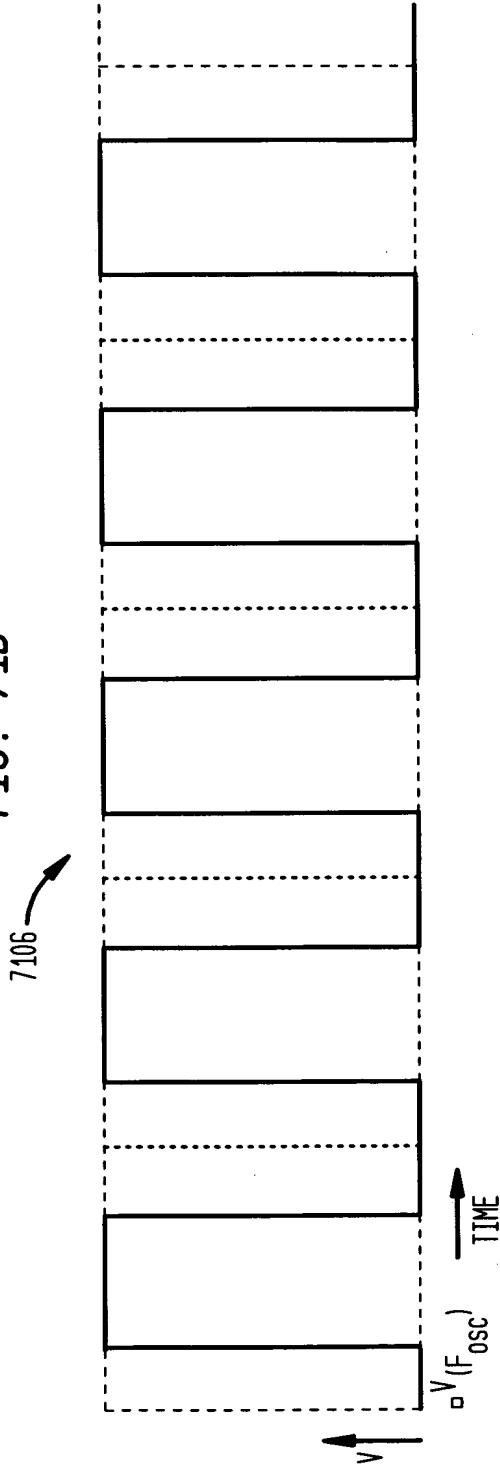


FIG. 71C

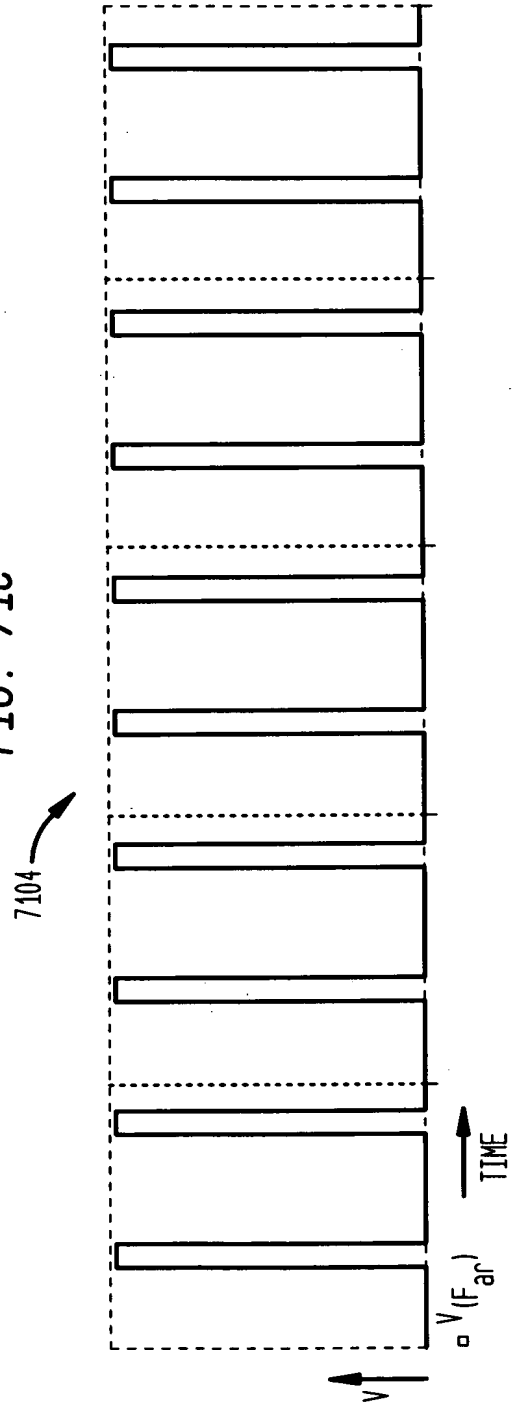
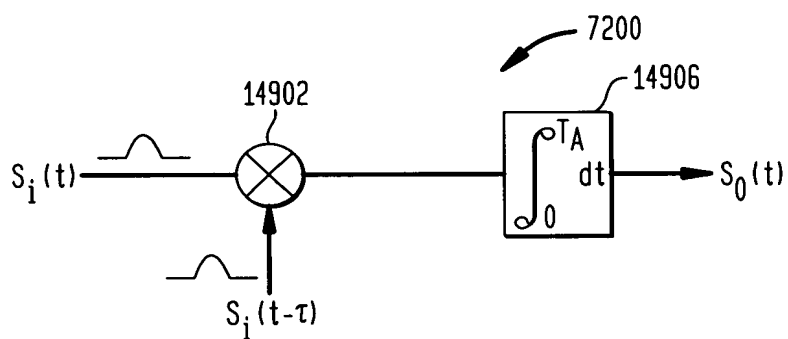
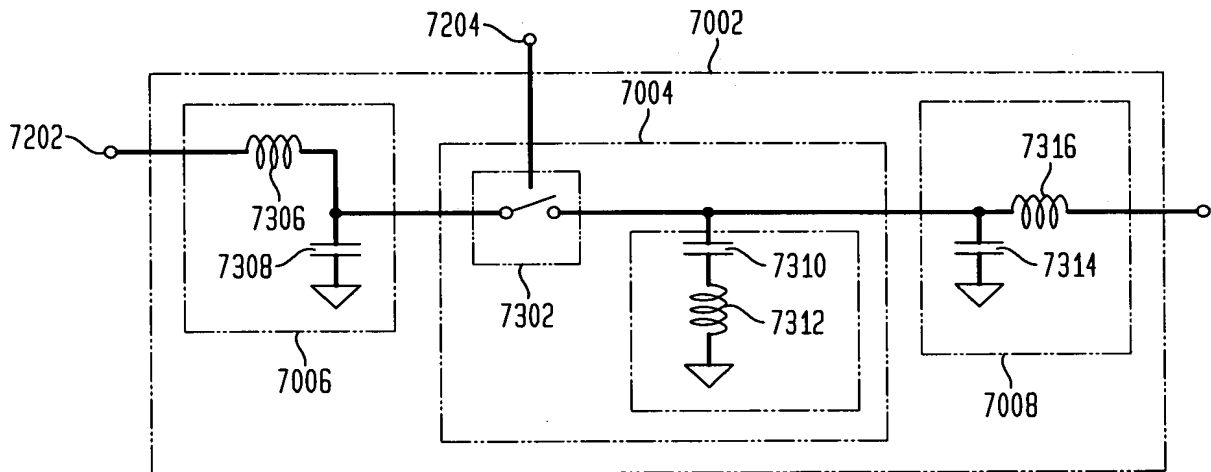


FIG. 72



**FIG. 73**

ALIASING MODULE



**FIG. 74**

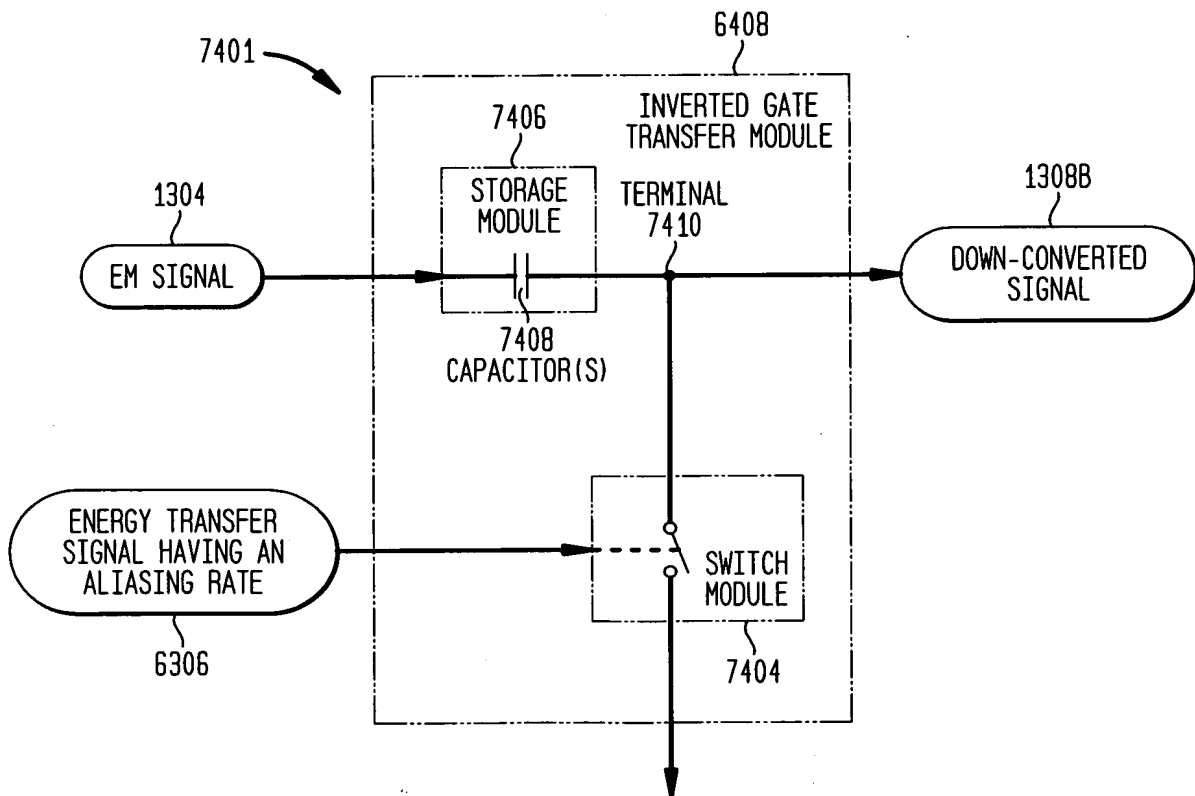
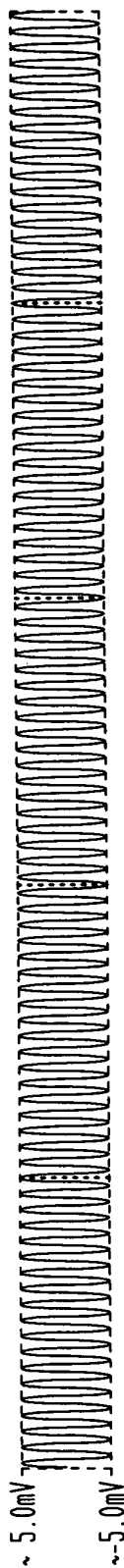
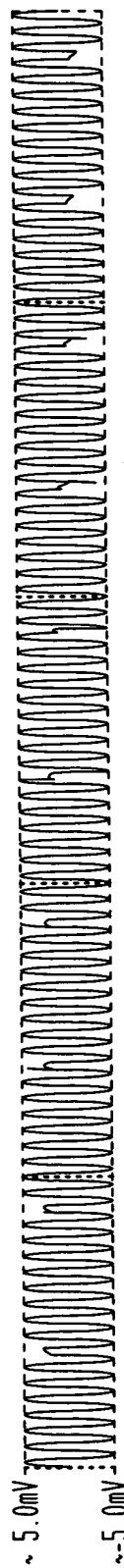


FIG. 75A



□ V (VOLTAGE-SRC)

FIG. 75B



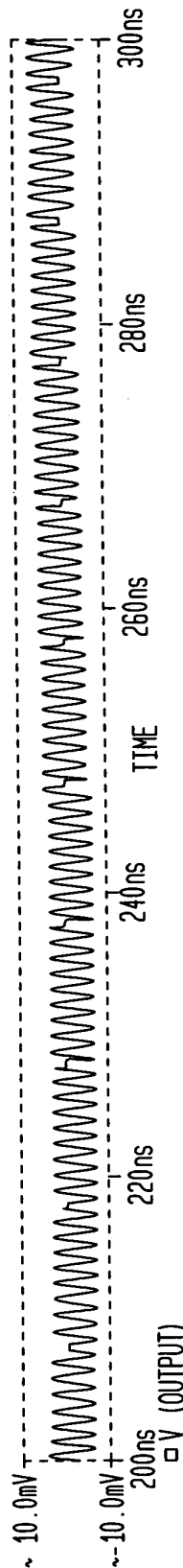
□ V (INPUT)

FIG. 75C



□ V (APERTURE)

FIG. 75D



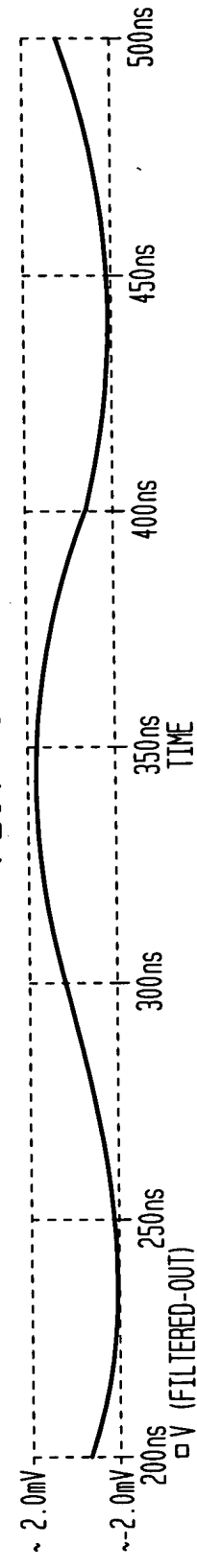
□ V (OUTPUT)

FIG. 75E

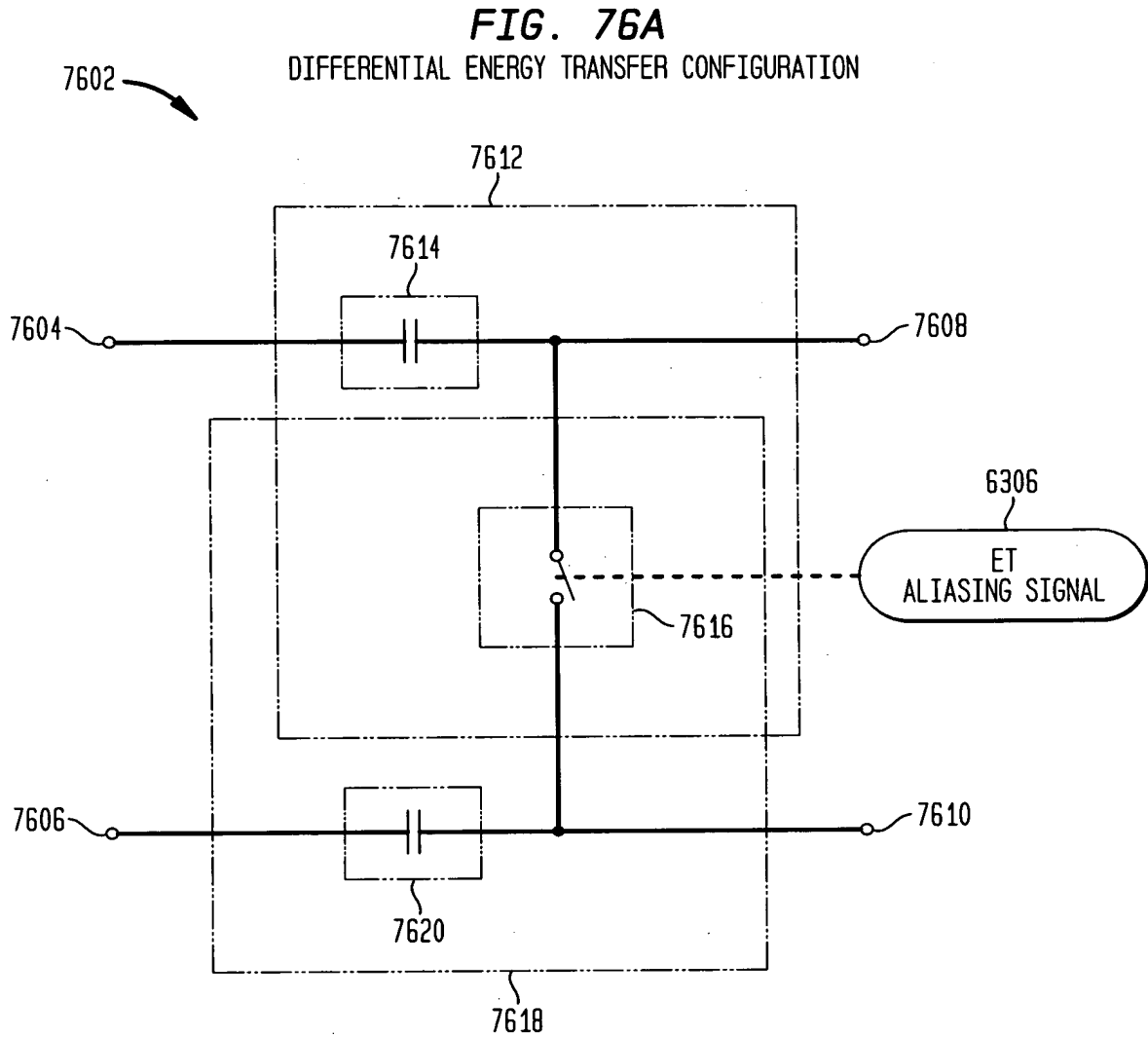


□ V (OUTPUT)

FIG. 75F

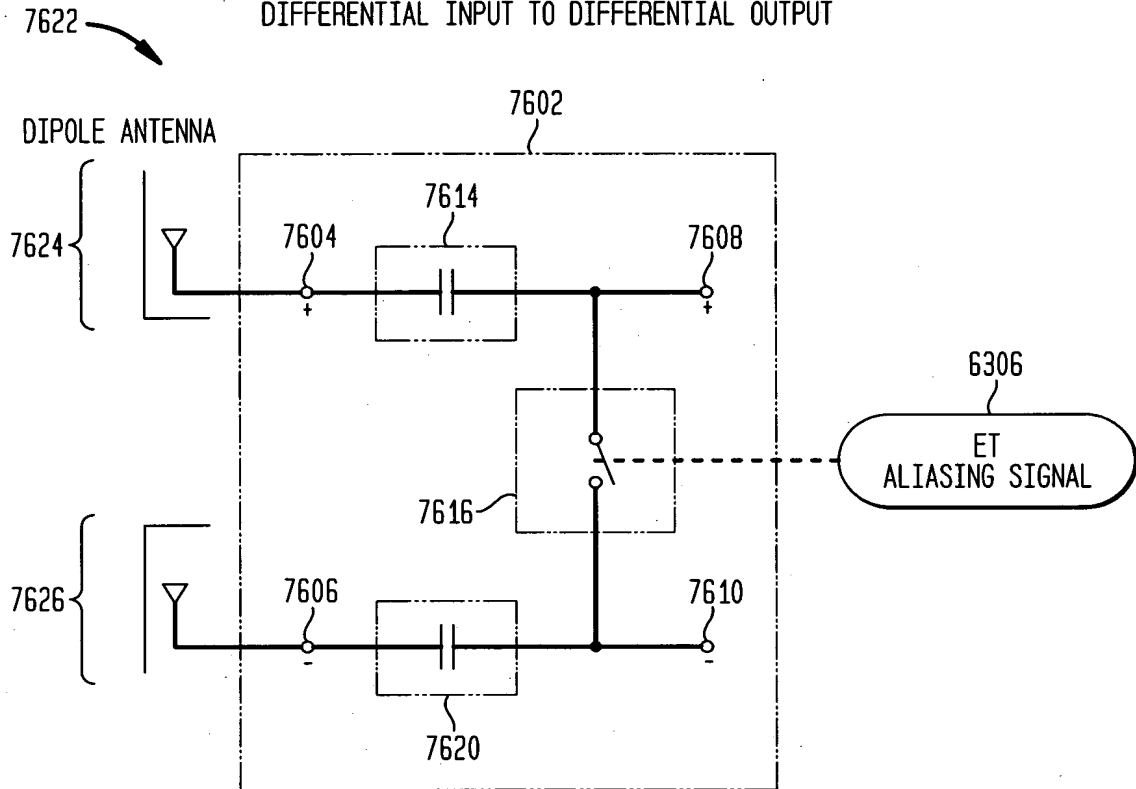


□ V (FILTERED-OUT)



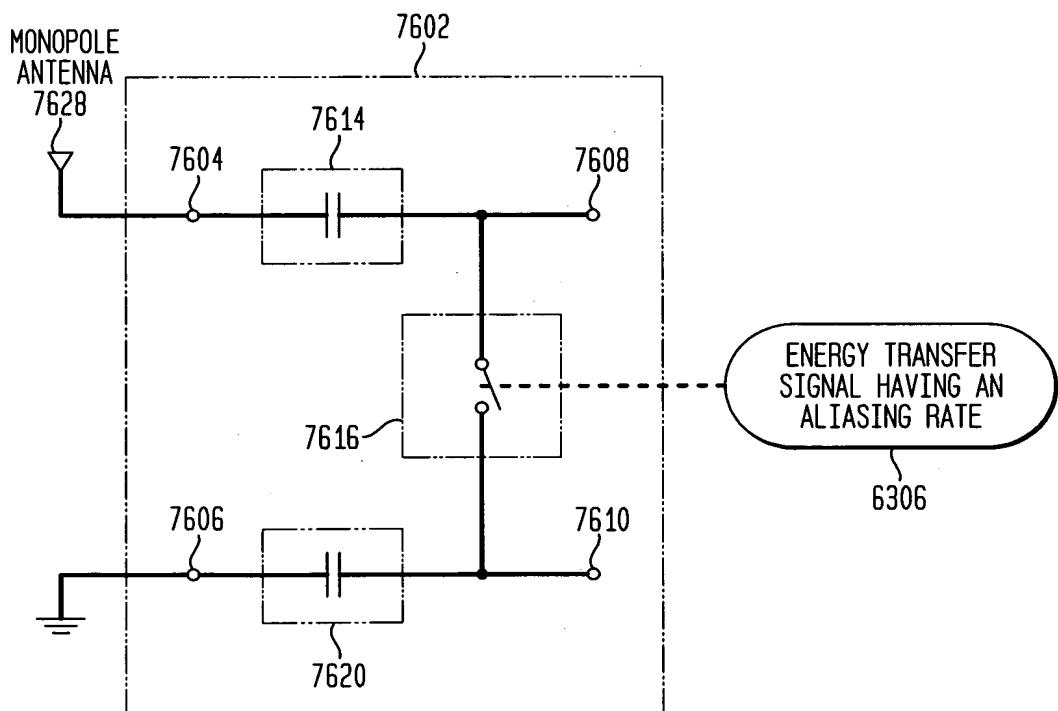
**FIG. 76B**

DIFFERENTIAL INPUT TO DIFFERENTIAL OUTPUT

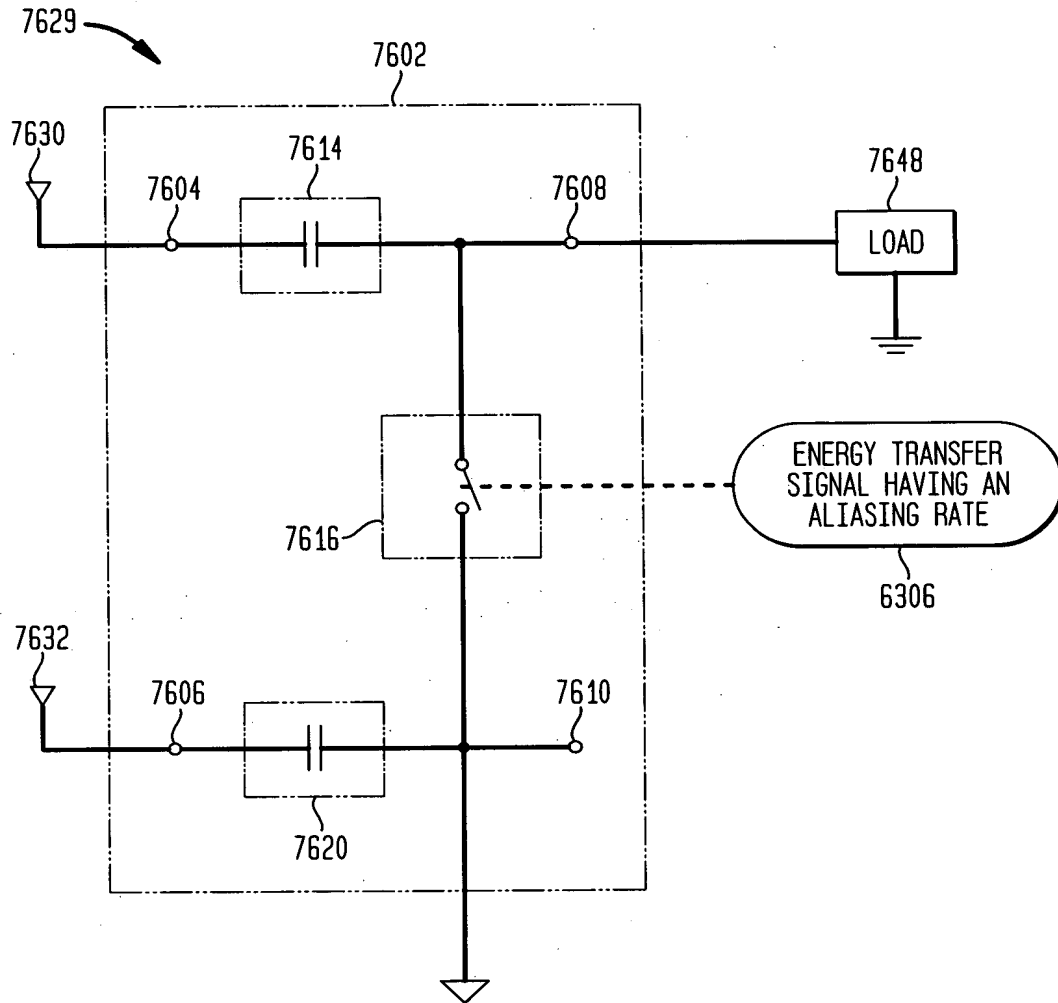


**FIG. 76C**

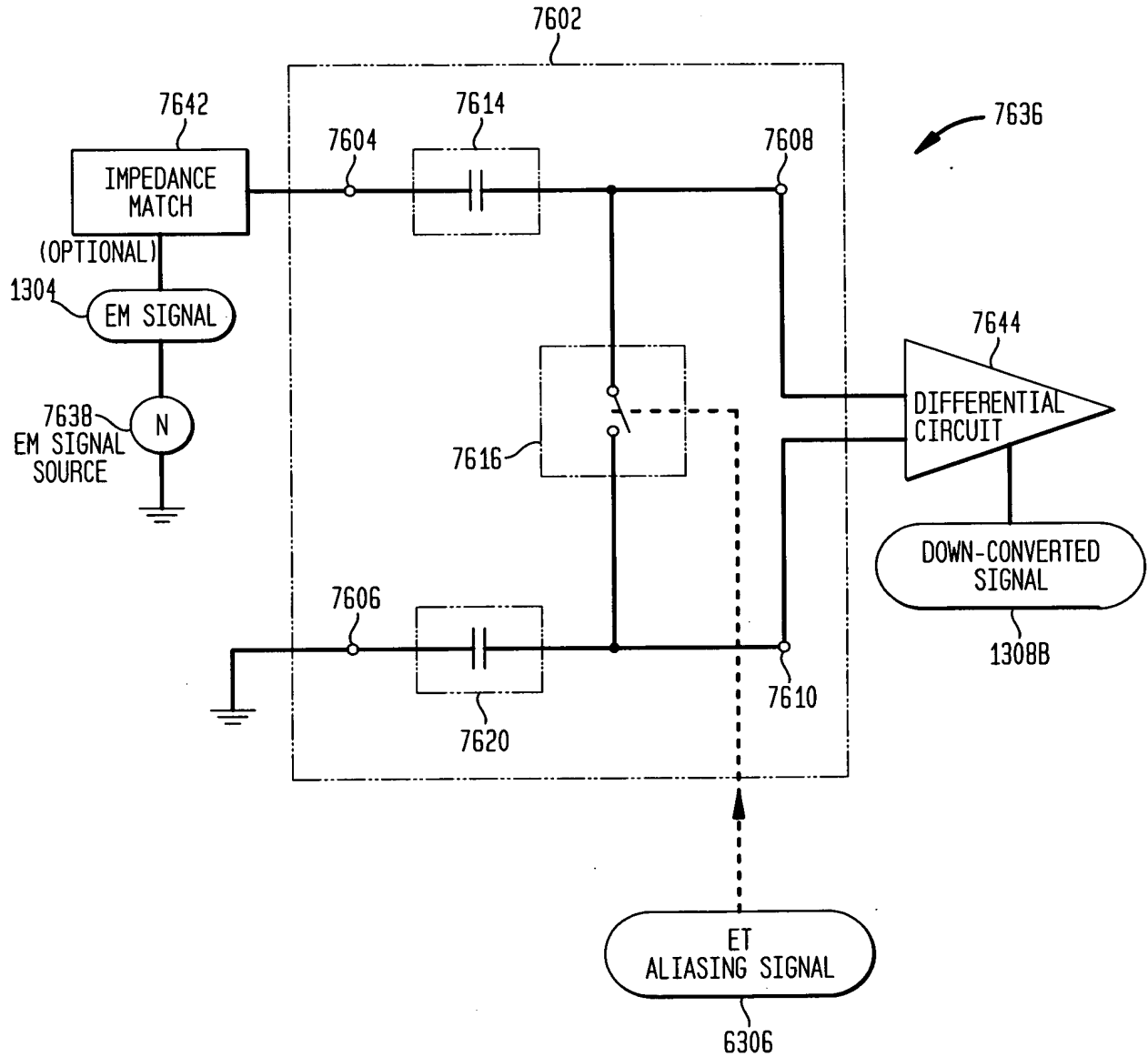
SINGLE INPUT TO DIFFERENTIAL OUTPUT



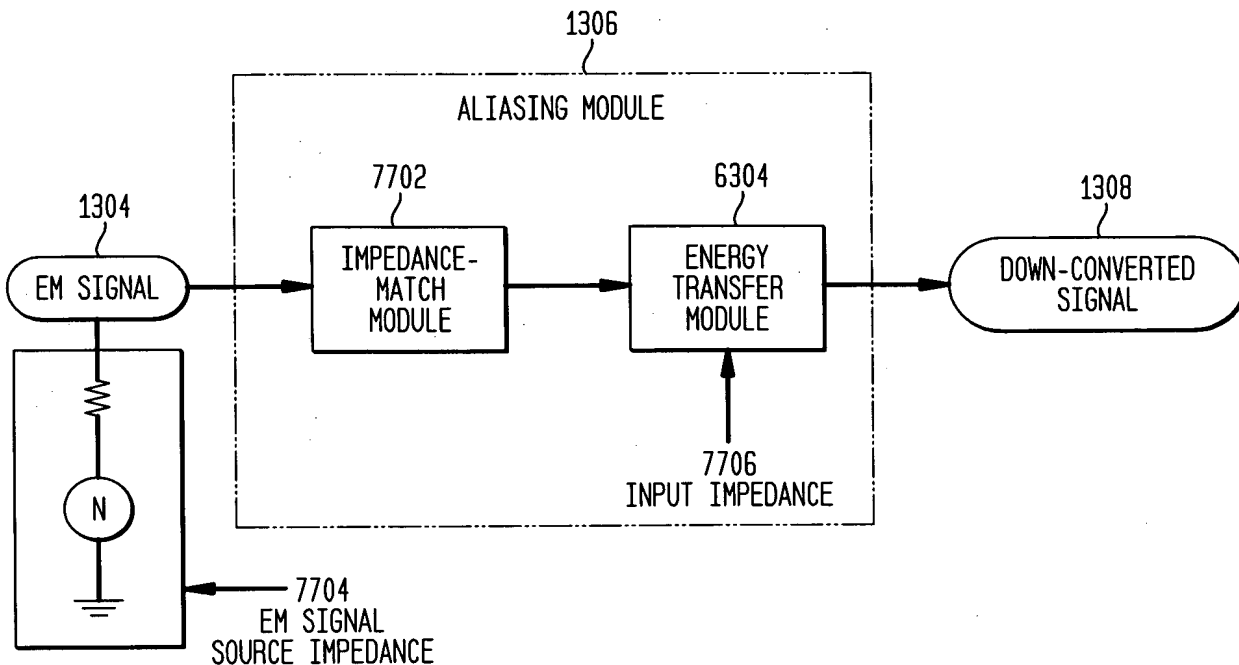
**FIG. 76D**  
 DIFFERENTIAL INPUT TO SINGLE OUTPUT



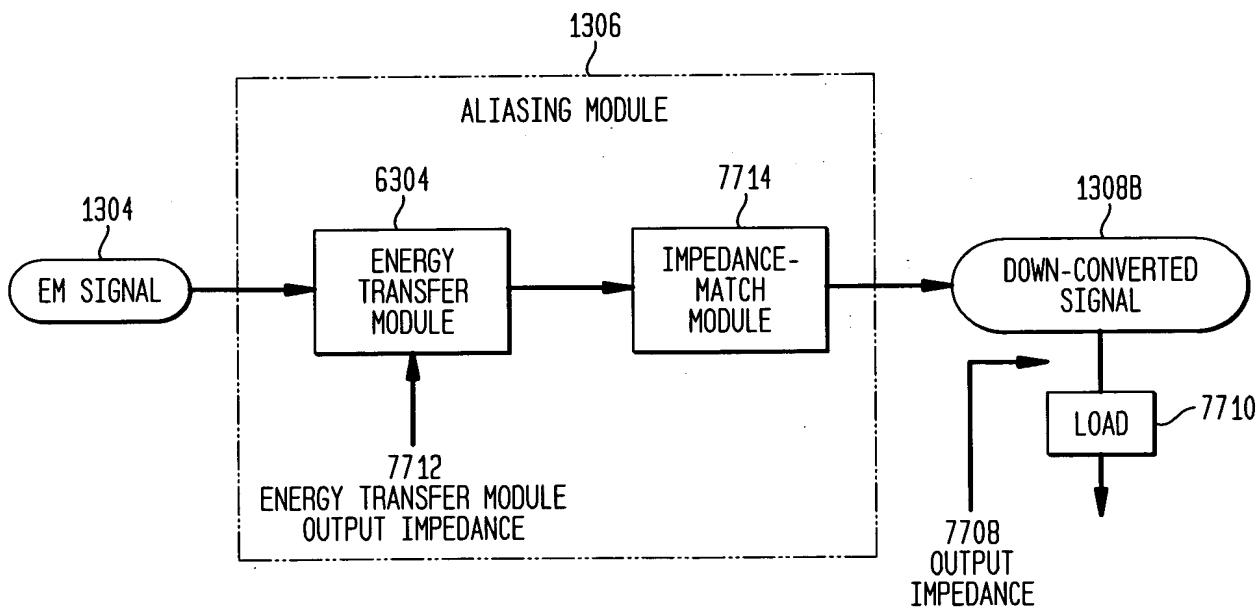
**FIG. 76E**  
 EXAMPLE INPUT/OUTPUT CIRCUITRY



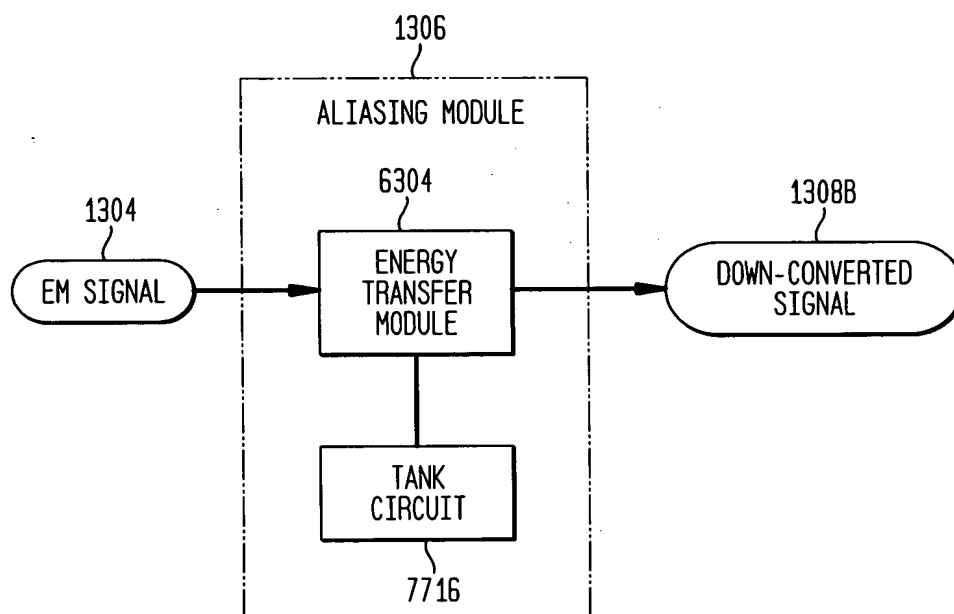
**FIG. 77A**



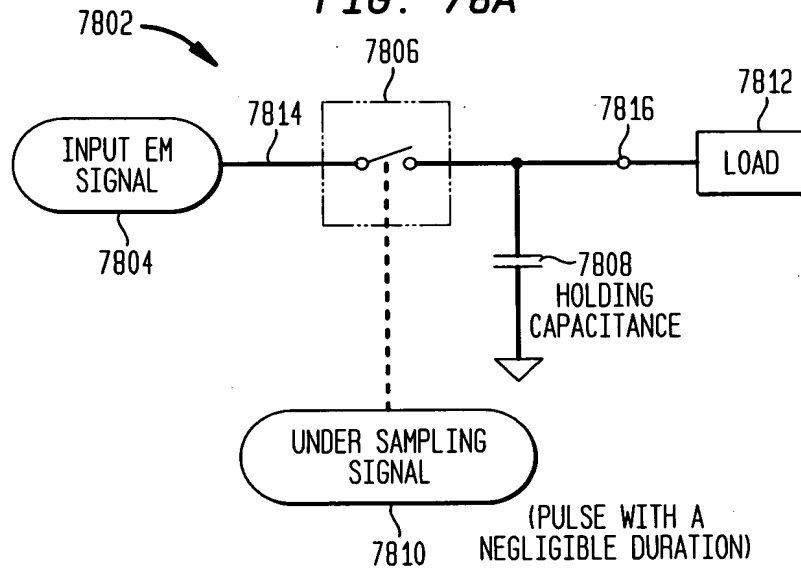
**FIG. 77B**



**FIG. 77C**



**FIG. 78A**



**FIG. 78B**

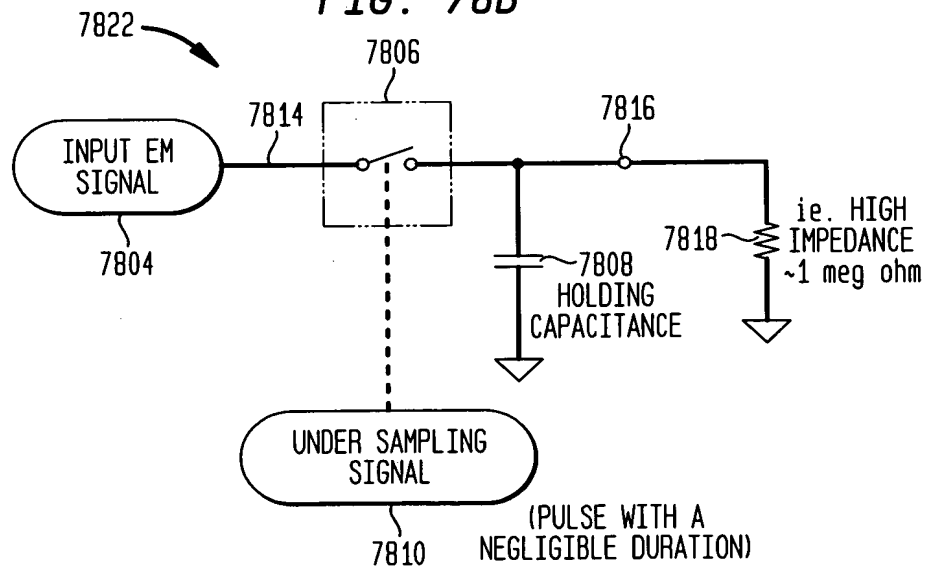


FIG. 79A

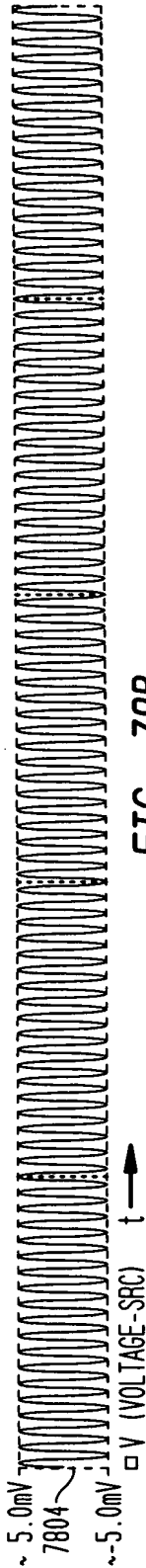


FIG. 79B

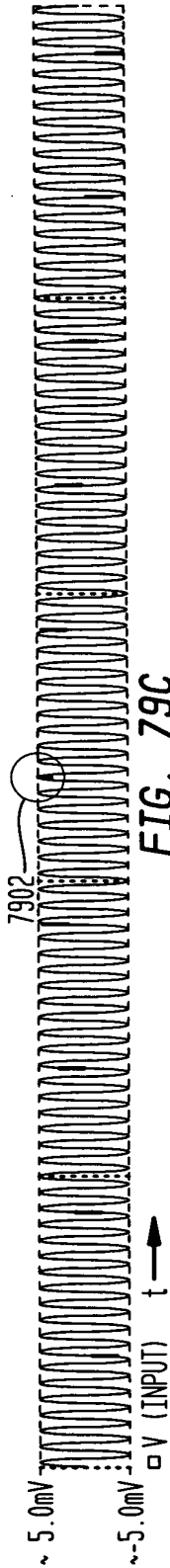


FIG. 79C

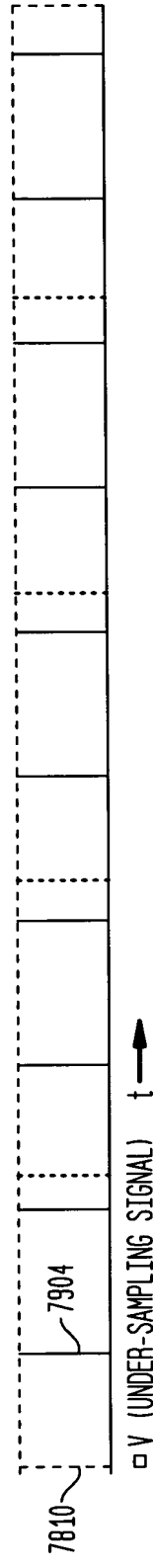


FIG. 79D

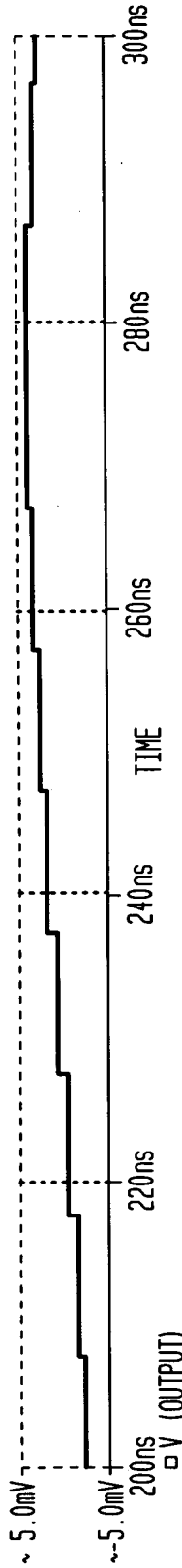


FIG. 79E

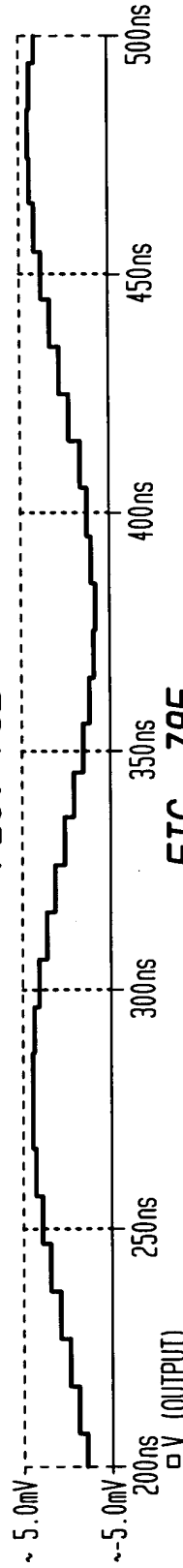


FIG. 79F

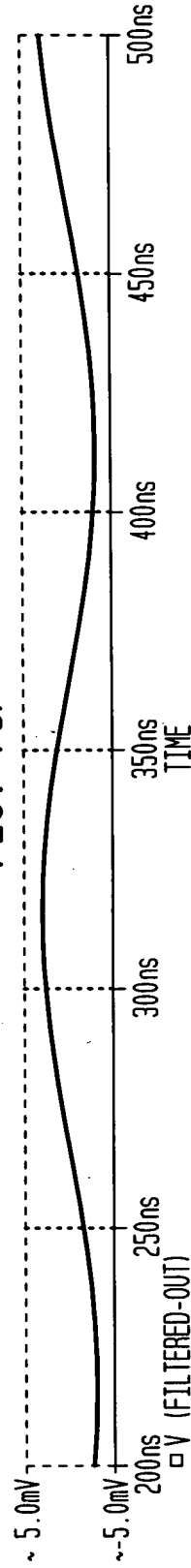


FIG. 80A



FIG. 80B

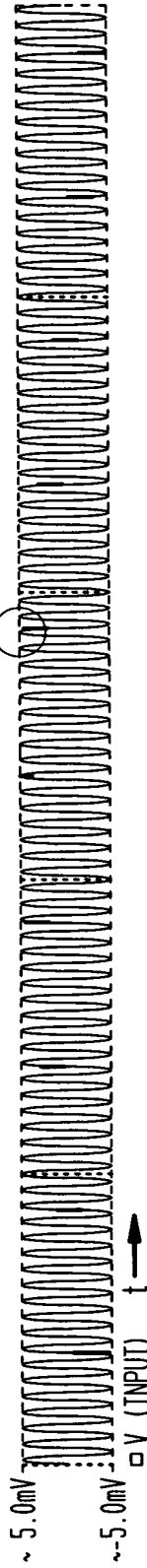


FIG. 80C

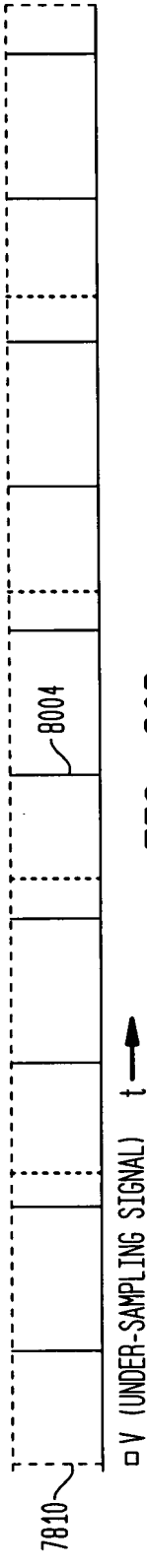


FIG. 80D

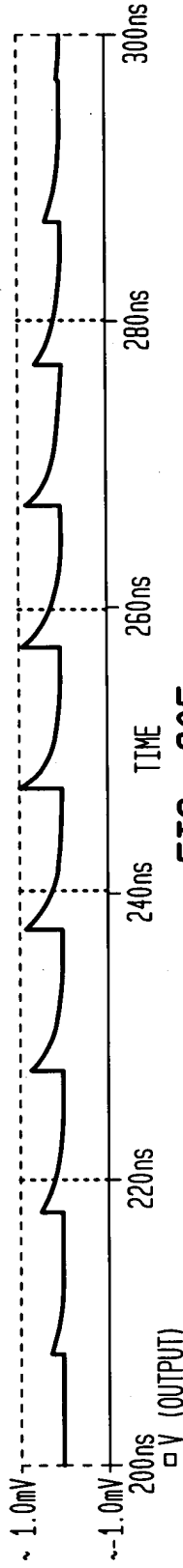


FIG. 80E

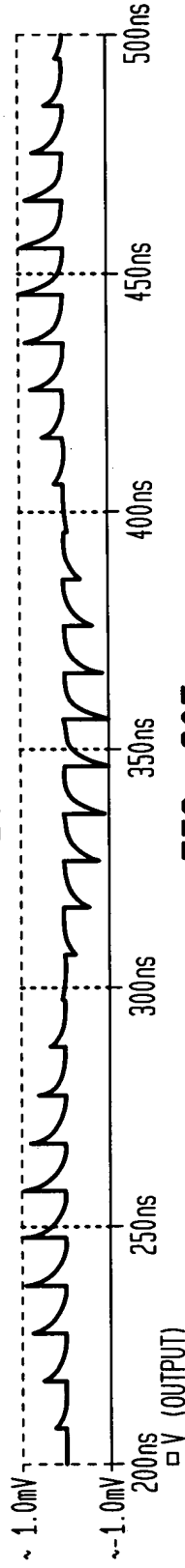


FIG. 80F

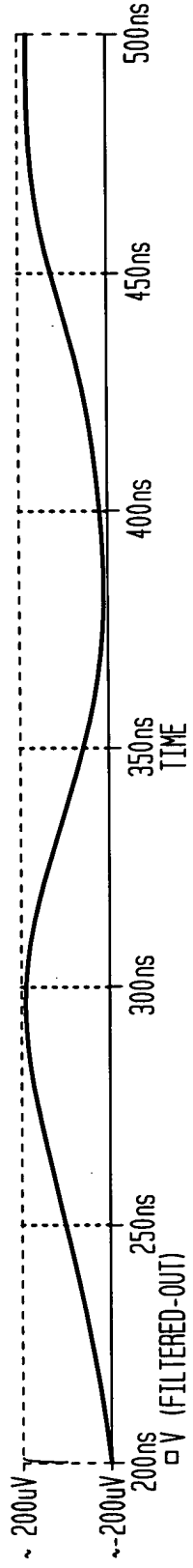


FIG. 81A



FIG. 81B

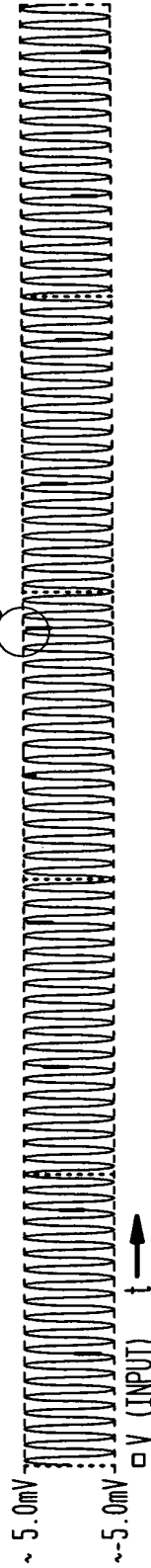


FIG. 81C

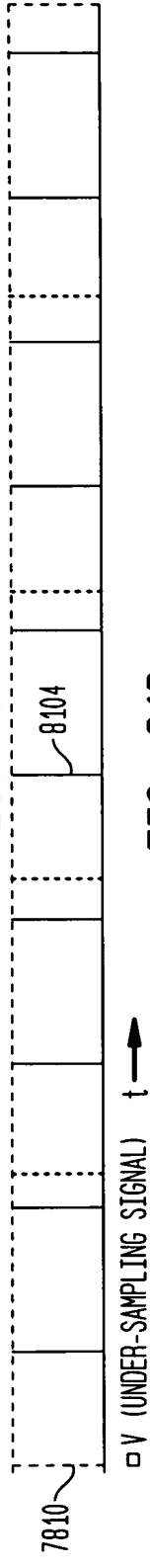


FIG. 81D

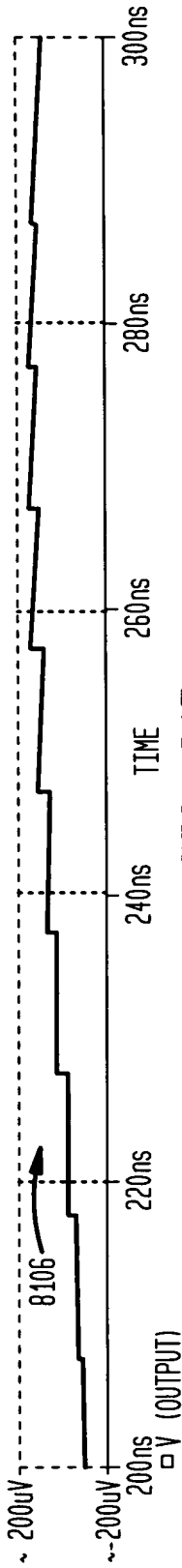


FIG. 81E

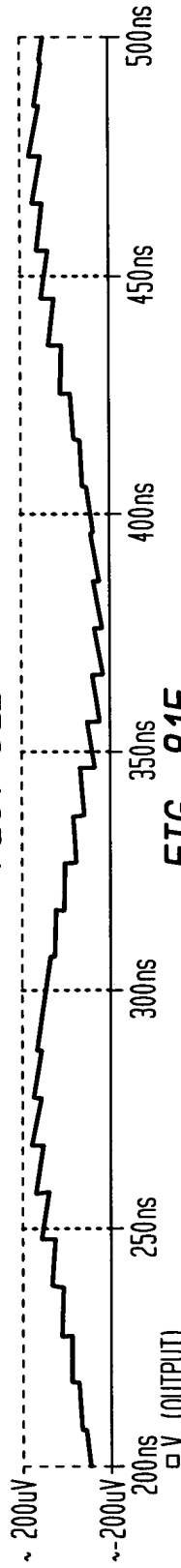
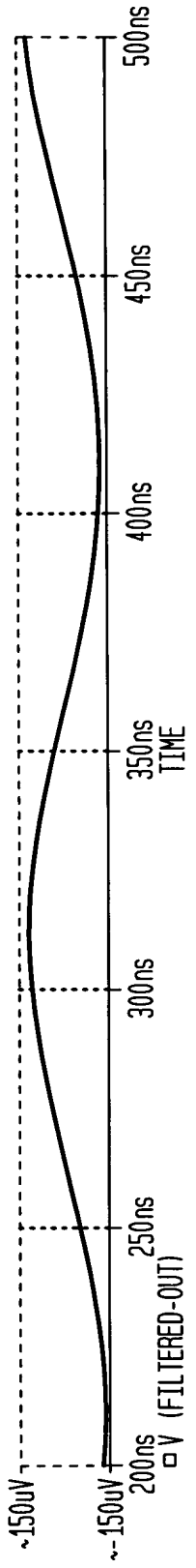


FIG. 81F



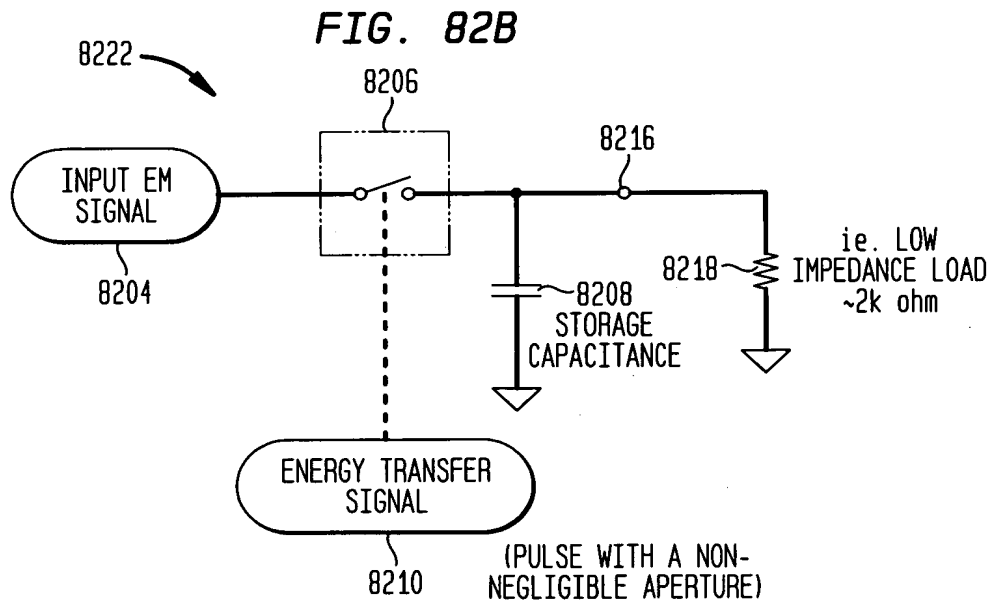
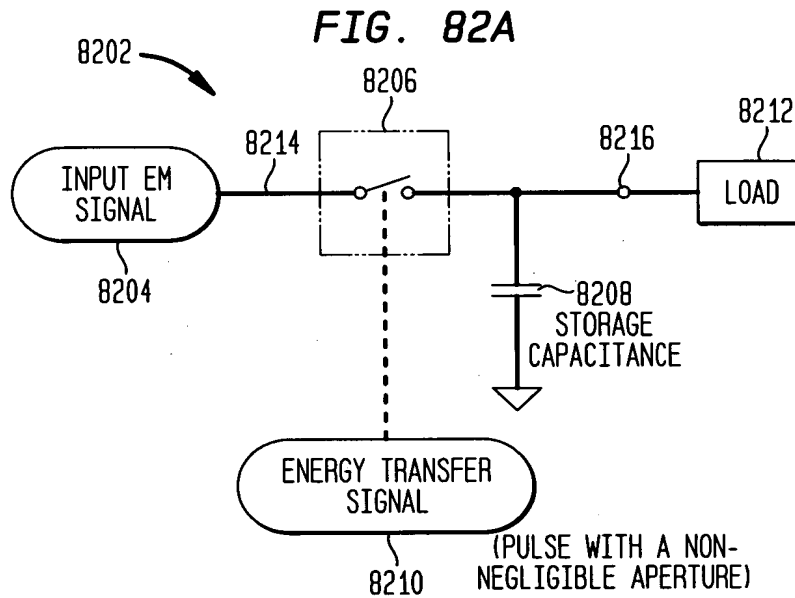


FIG. 83A



FIG. 83B

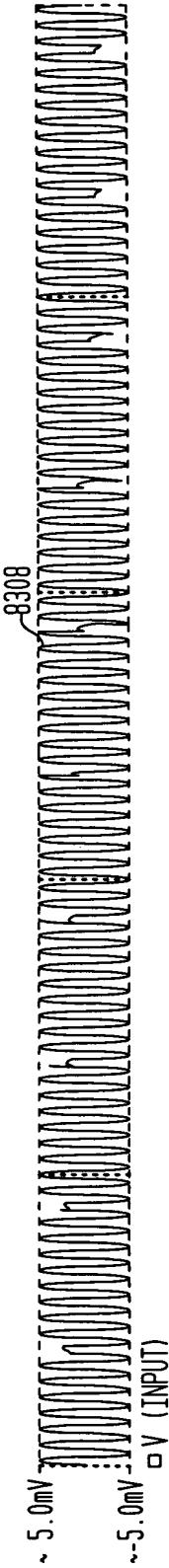


FIG. 83C

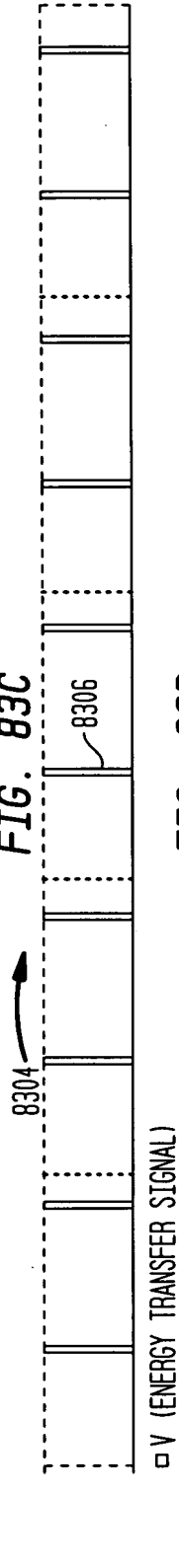


FIG. 83D

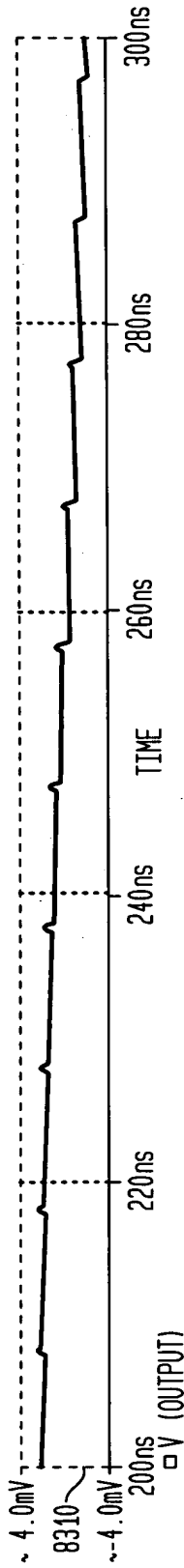


FIG. 83E

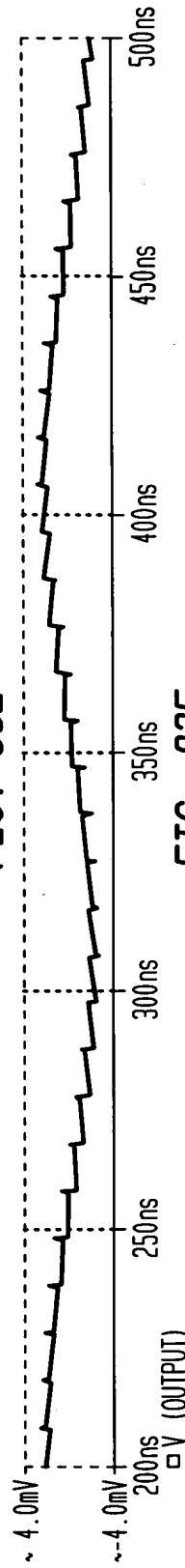
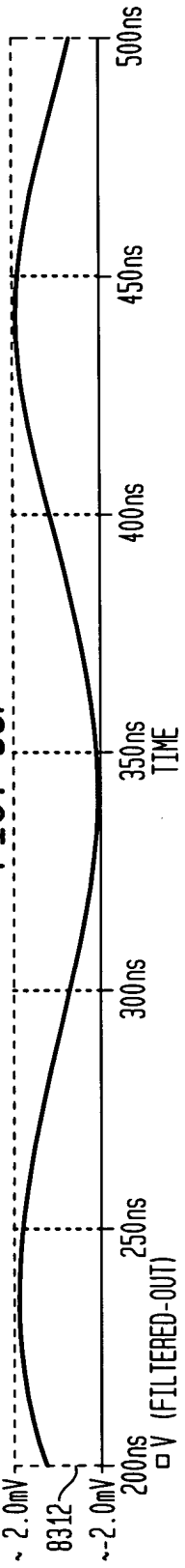
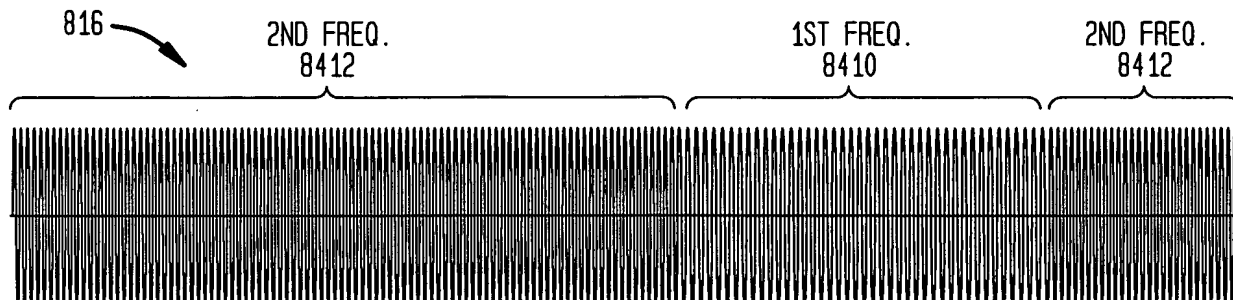


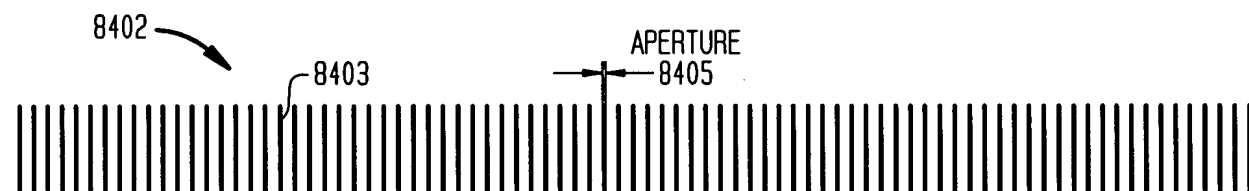
FIG. 83F



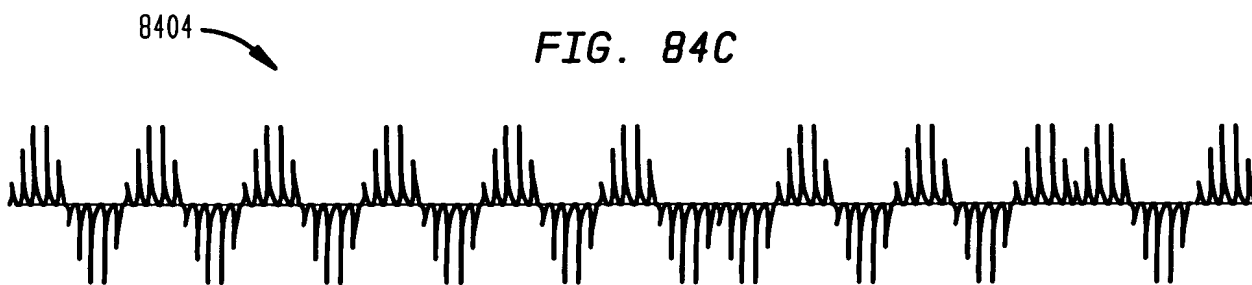
**FIG. 84A**



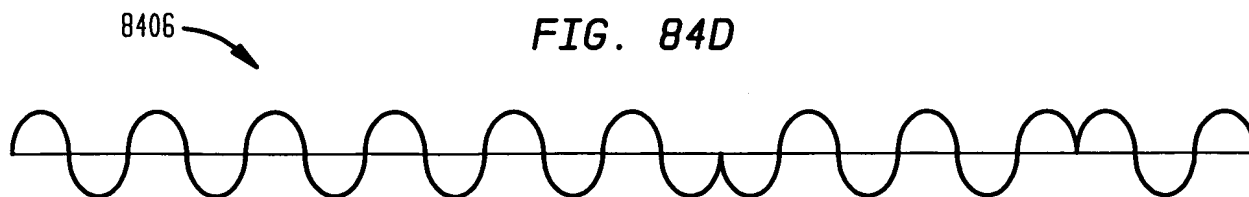
**FIG. 84B**



**FIG. 84C**



**FIG. 84D**



**FIG. 85A**

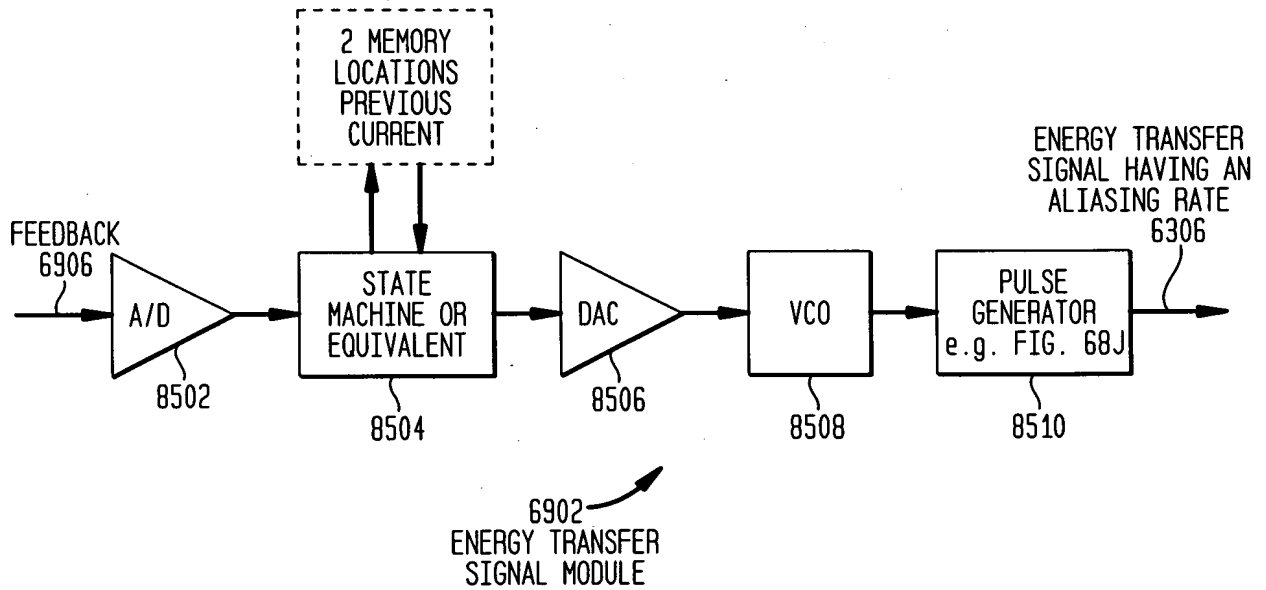
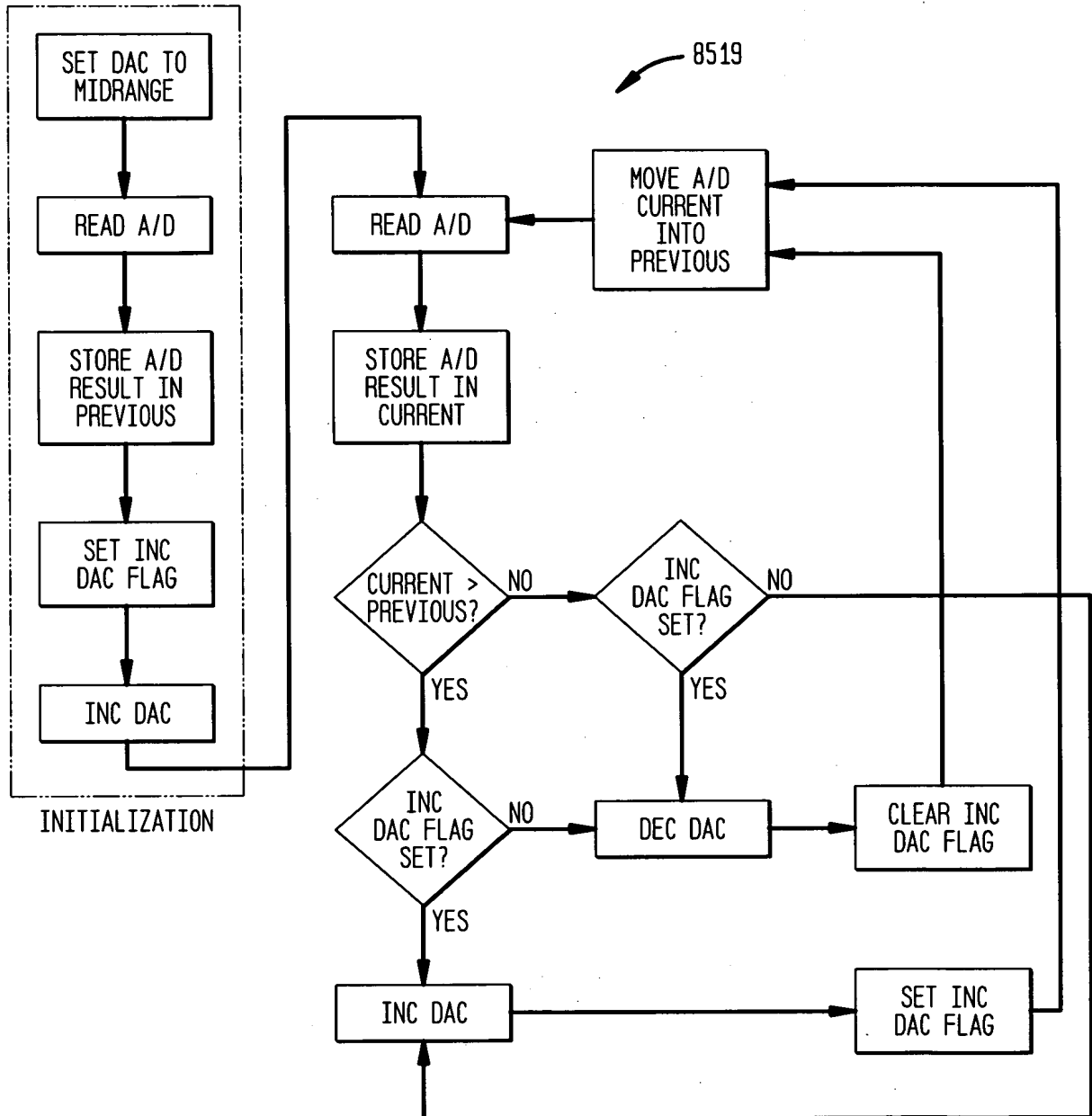
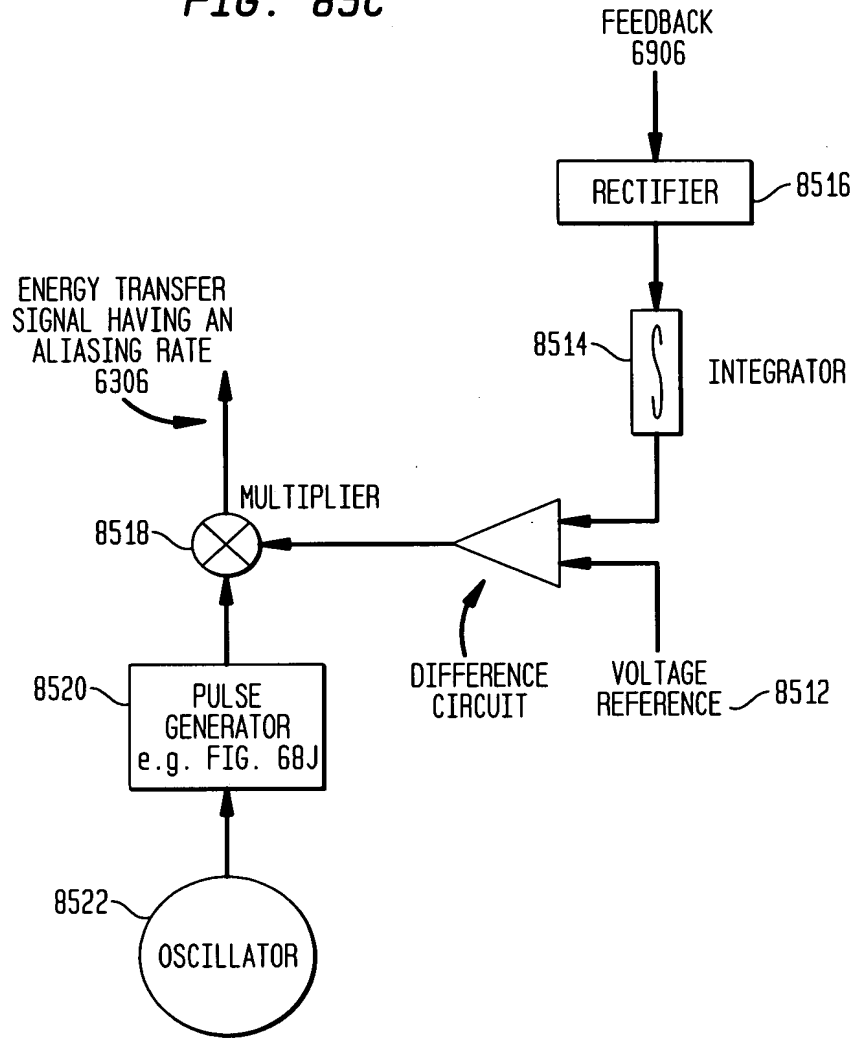


FIG. 85B



STATE MACHINE FLOWCHART

**FIG. 85C**



**ENERGY TRANSFER SIGNAL MODULE 6902**

FIG. 86

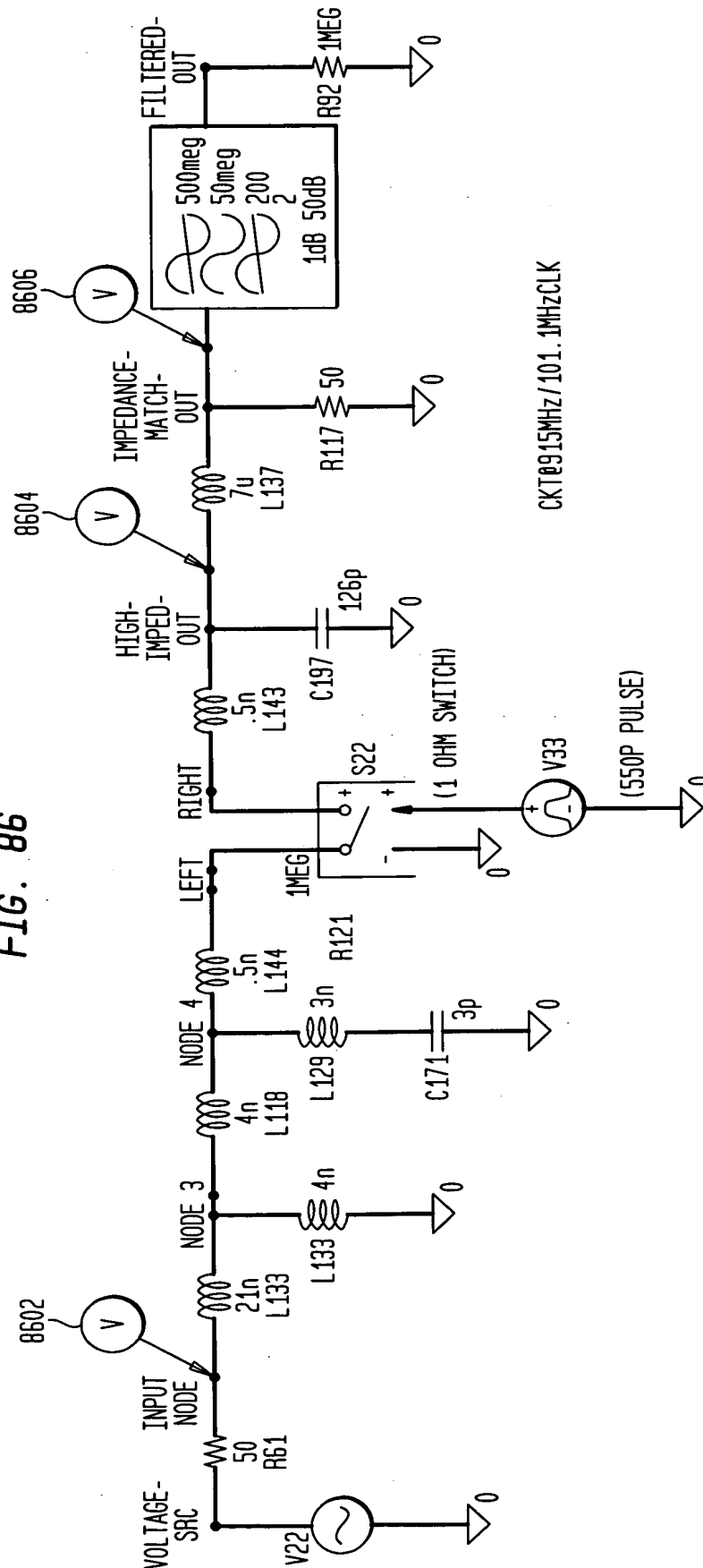


FIG. 87

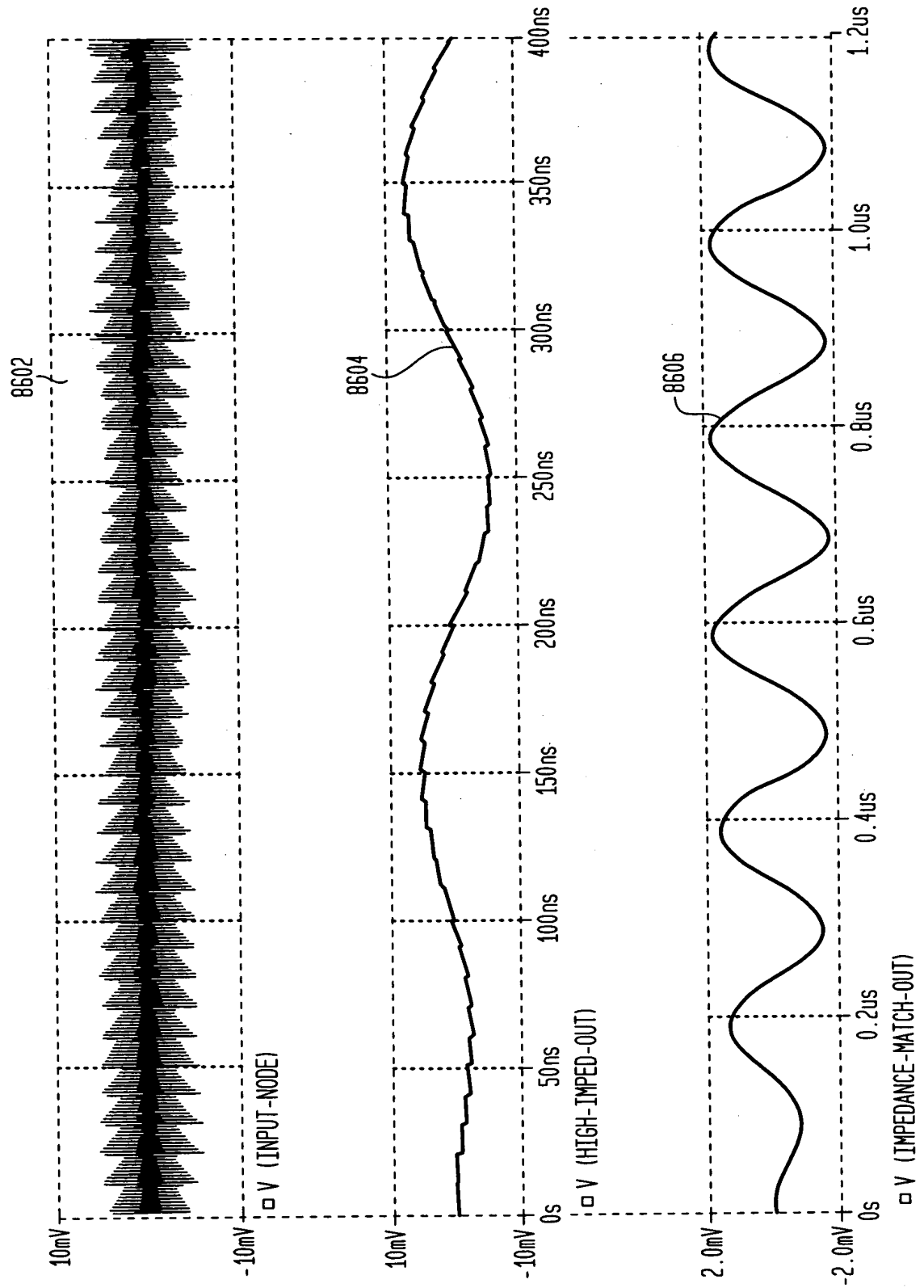


FIG. 88

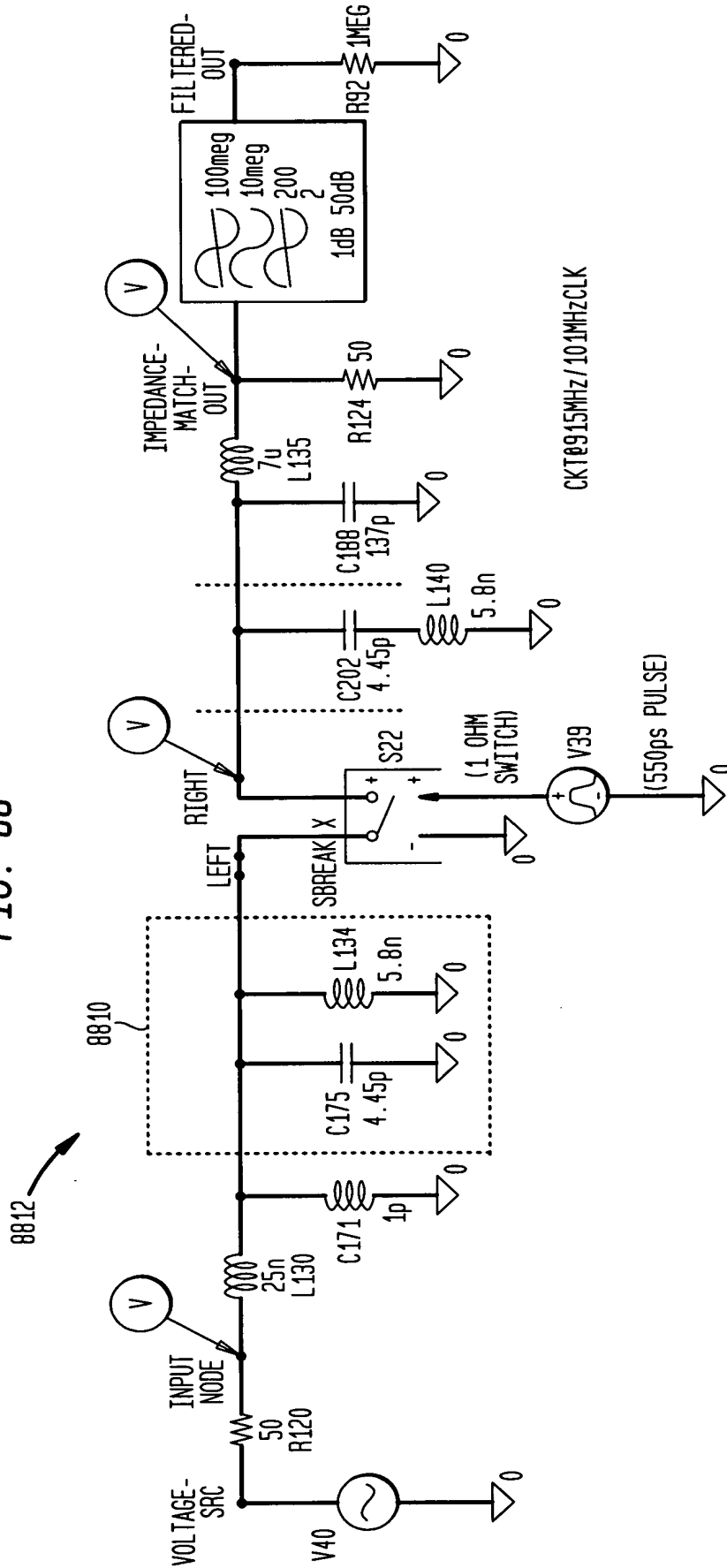


FIG. 89

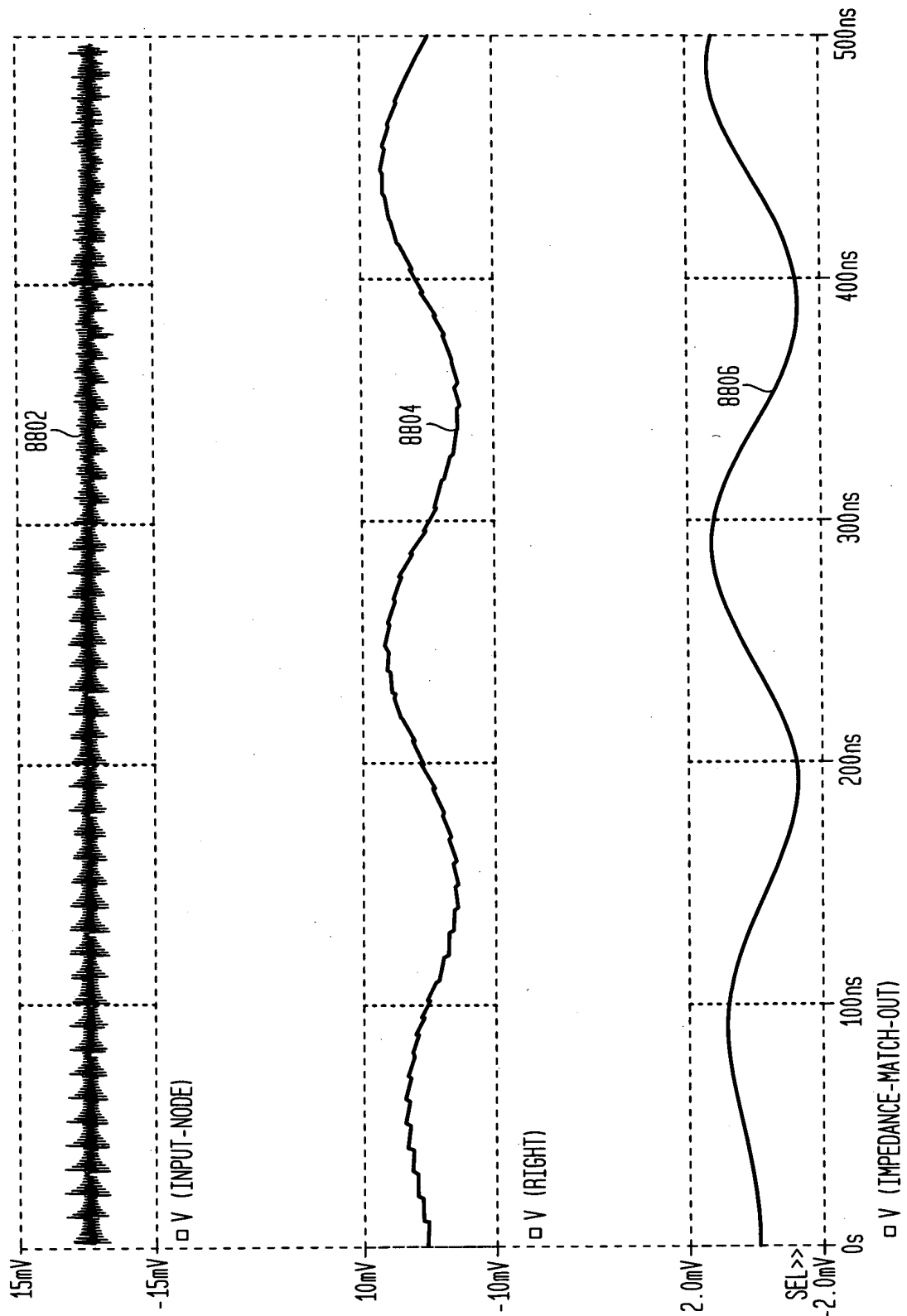


FIG. 90

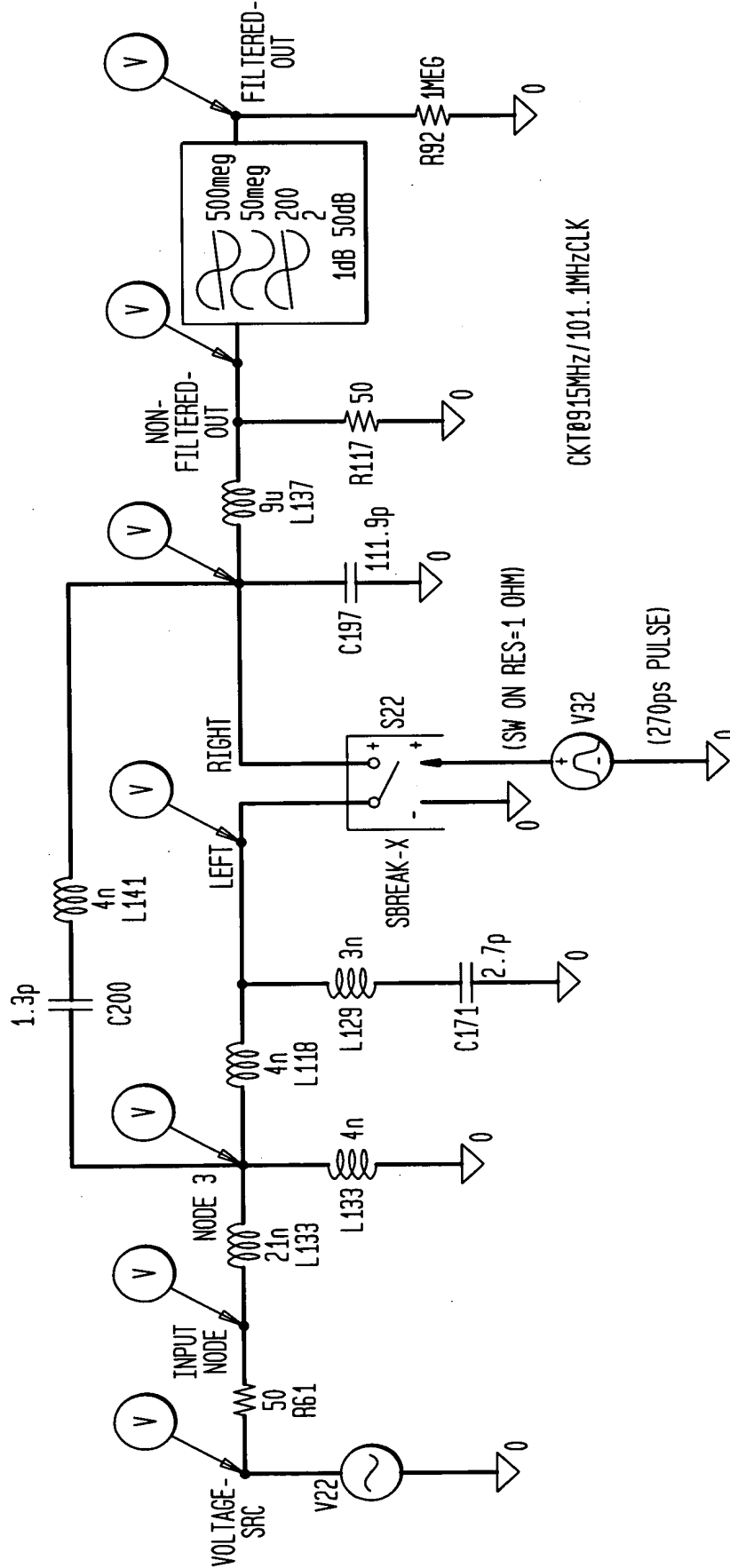


FIG. 91

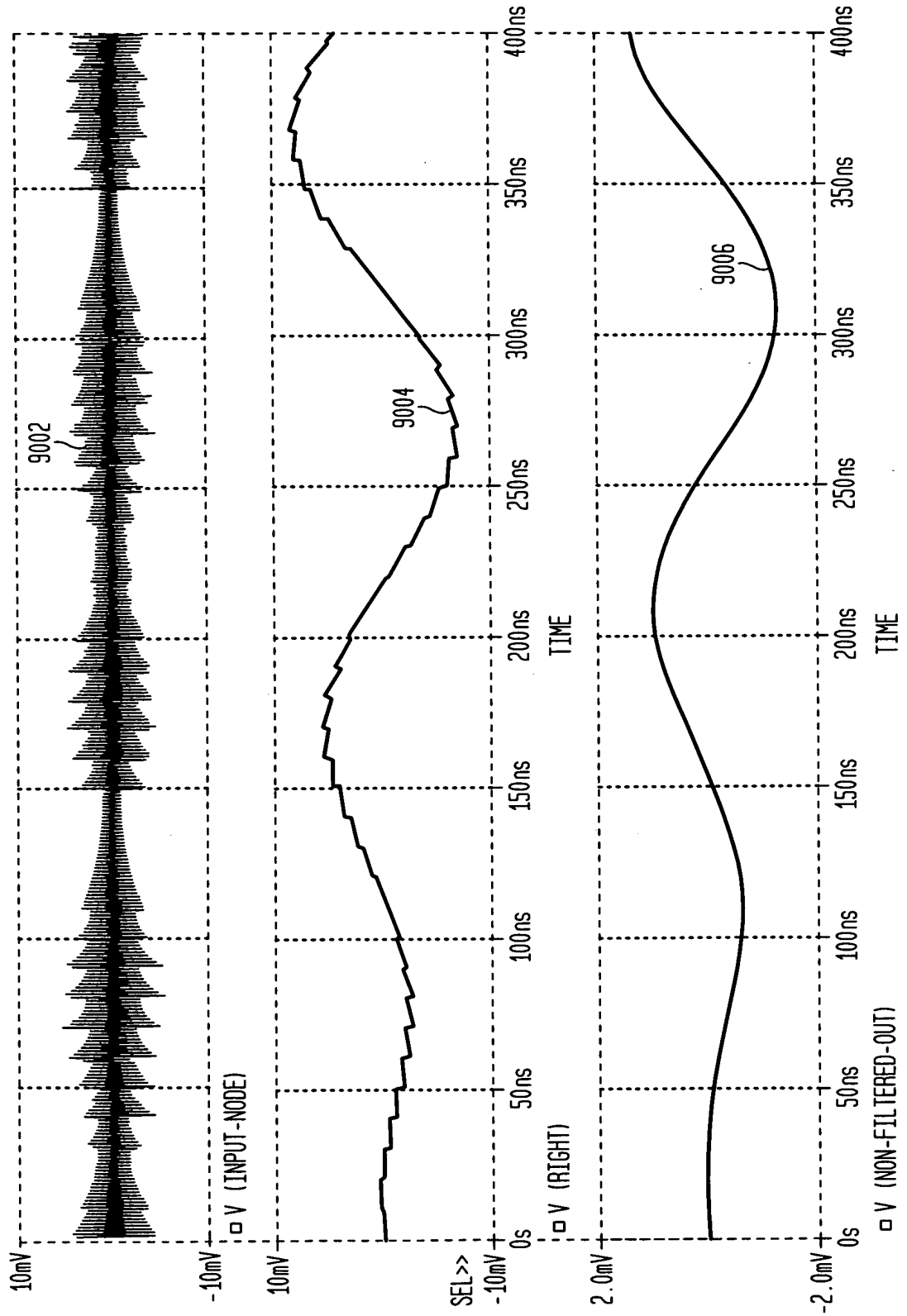


FIG. 92

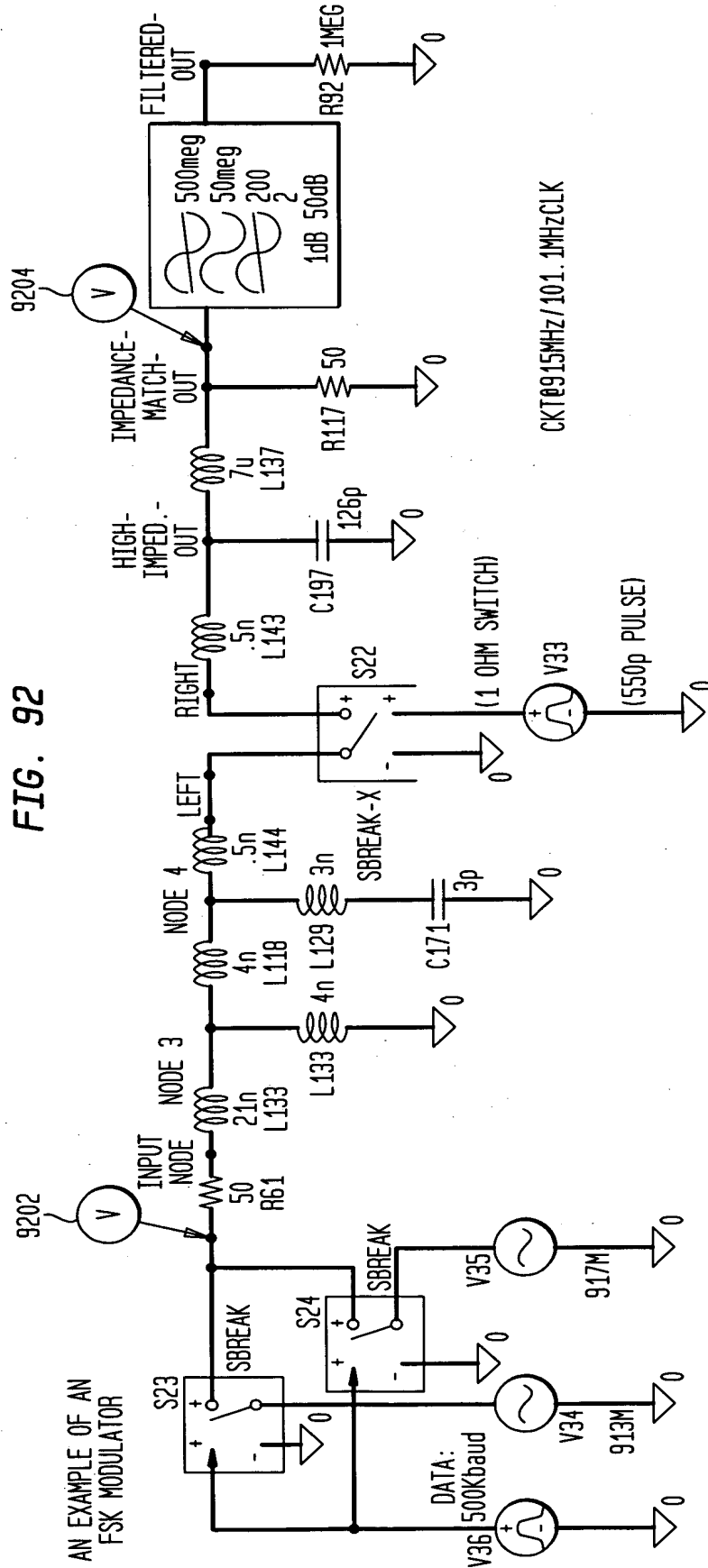


FIG. 93

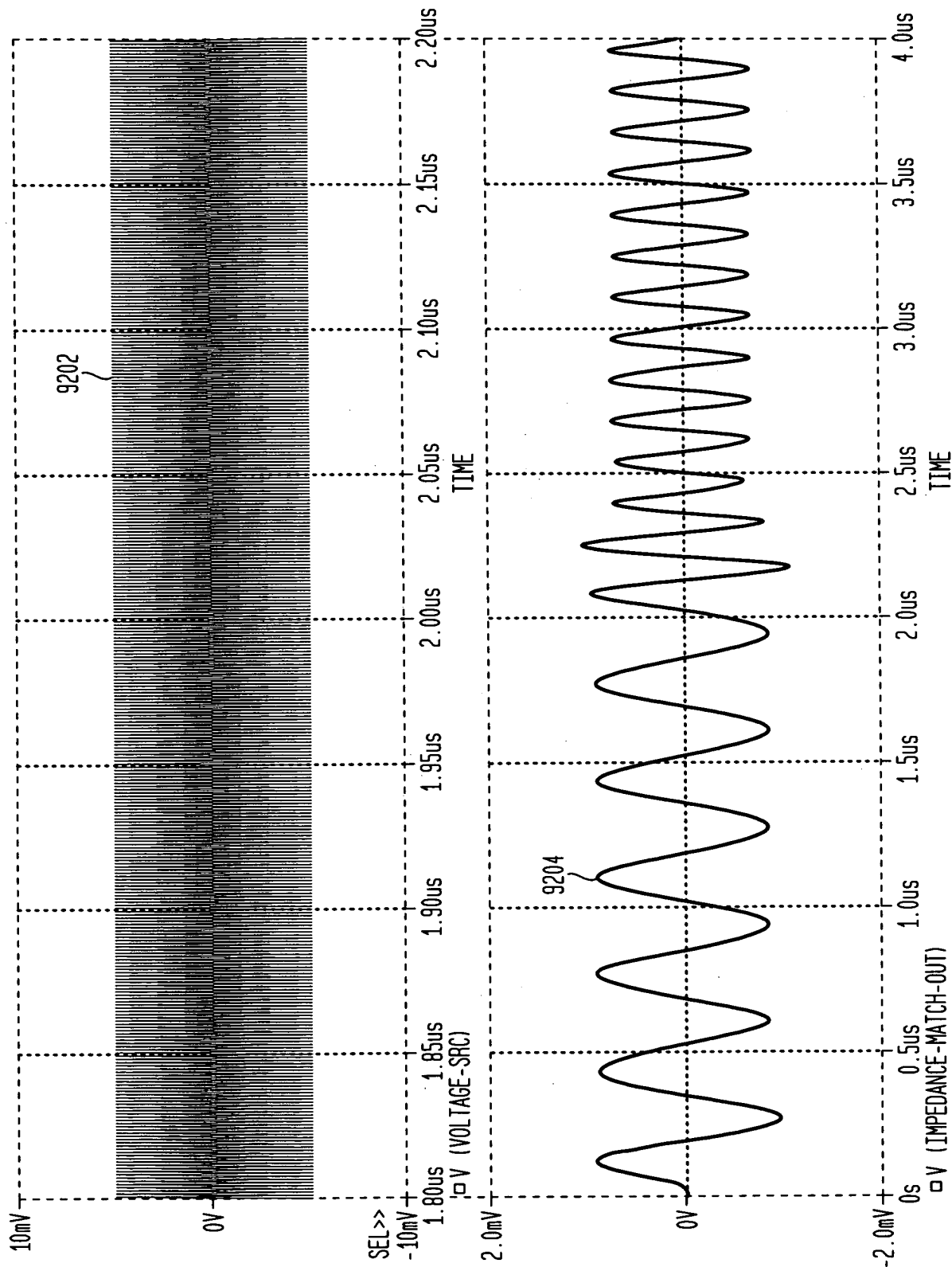


FIG. 94A

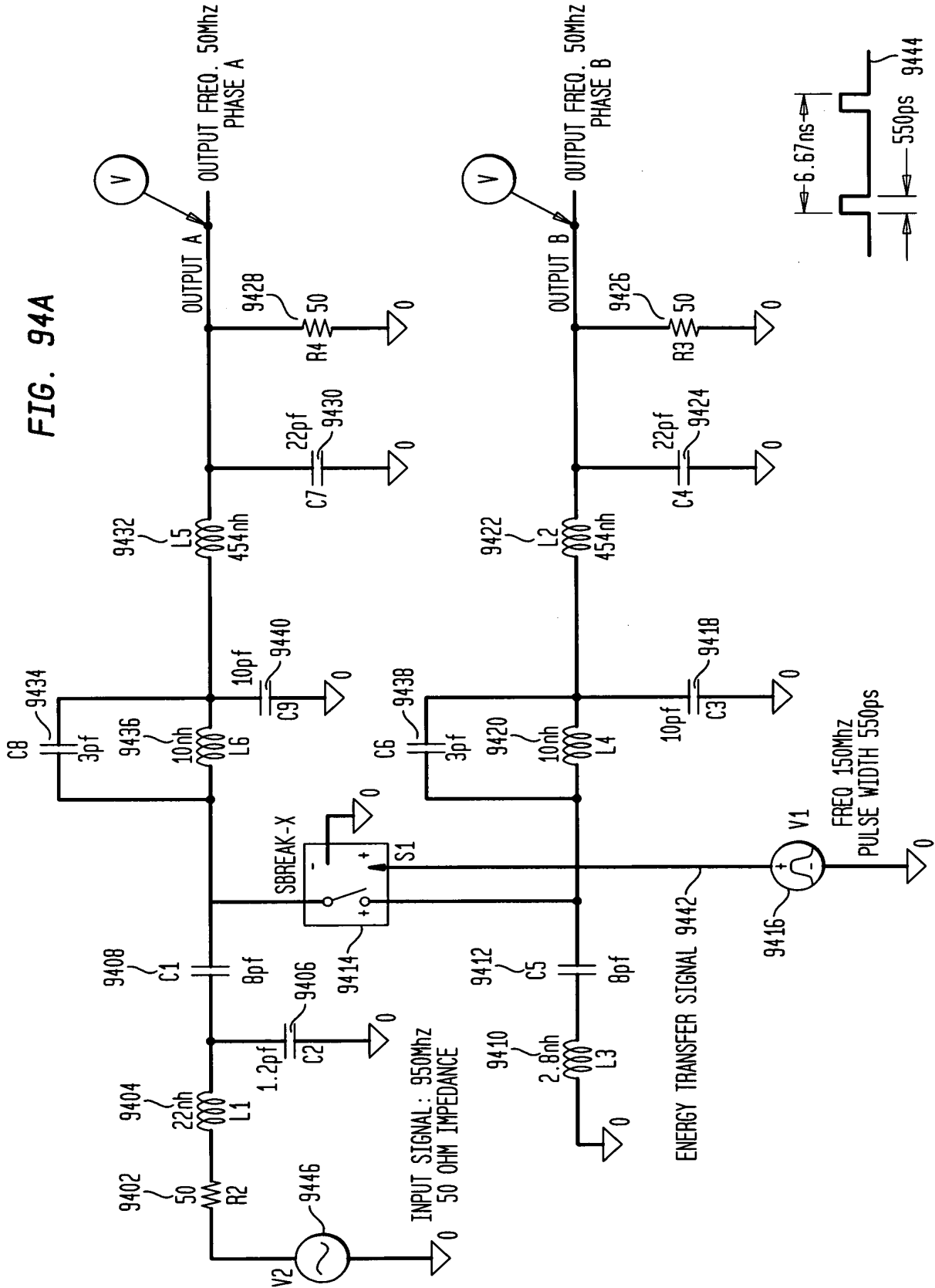


FIG. 94B

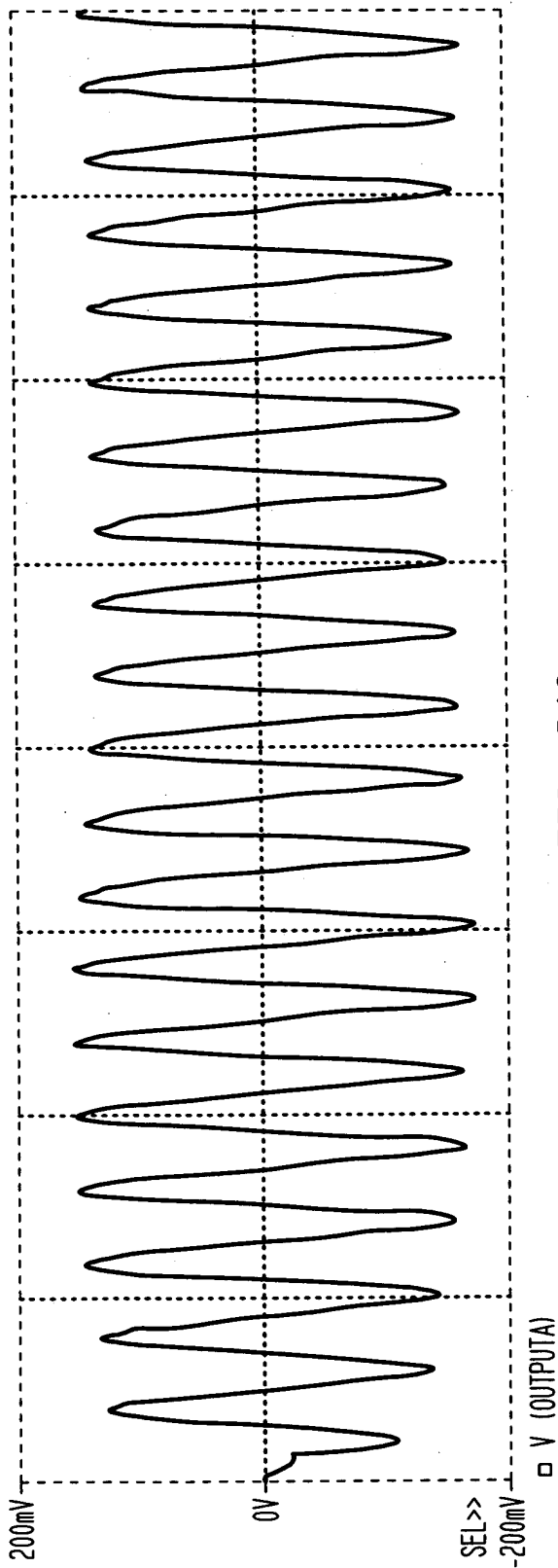
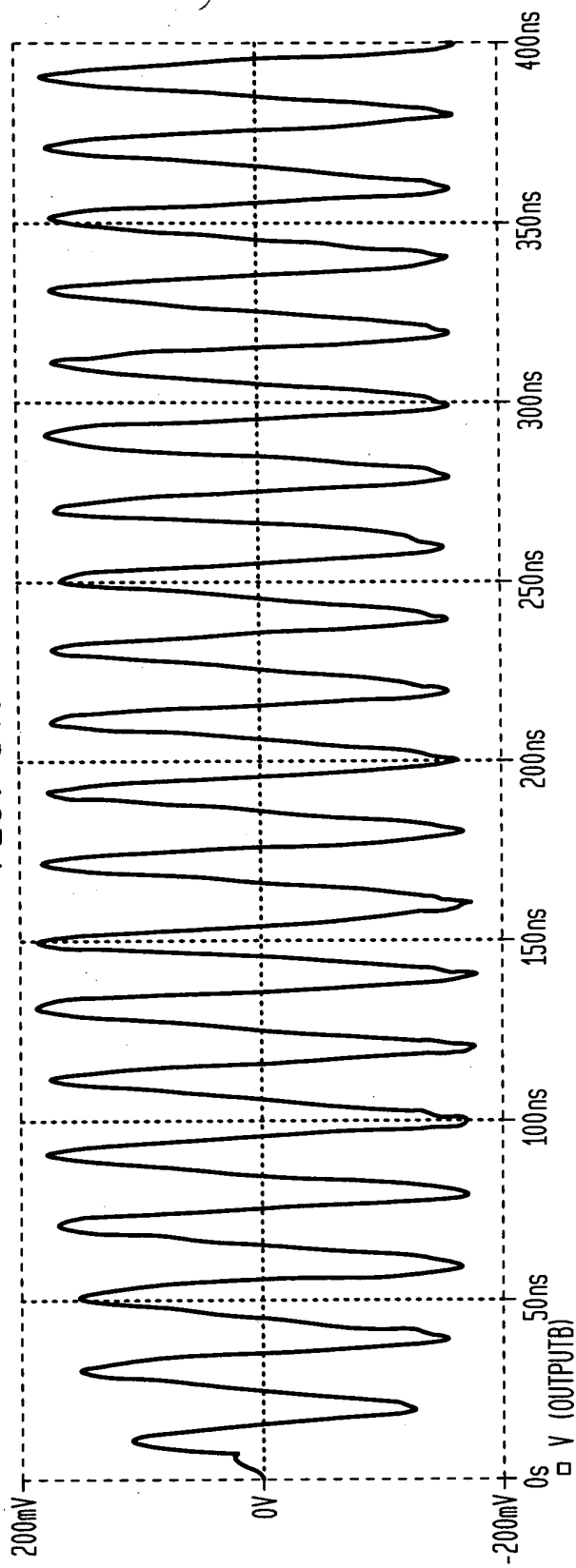


FIG. 94C



**FIG. 95**

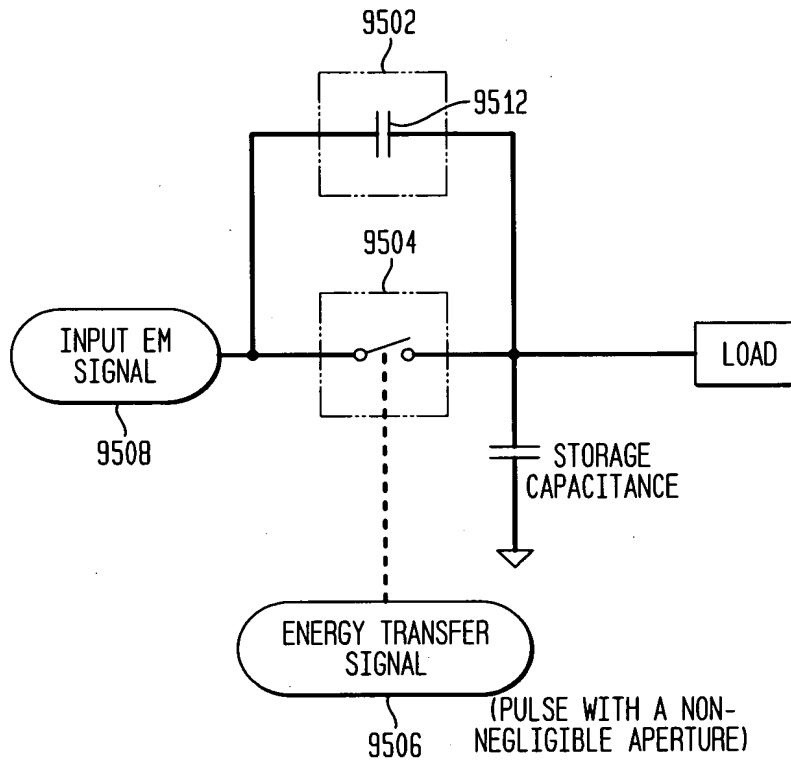


FIG. 96

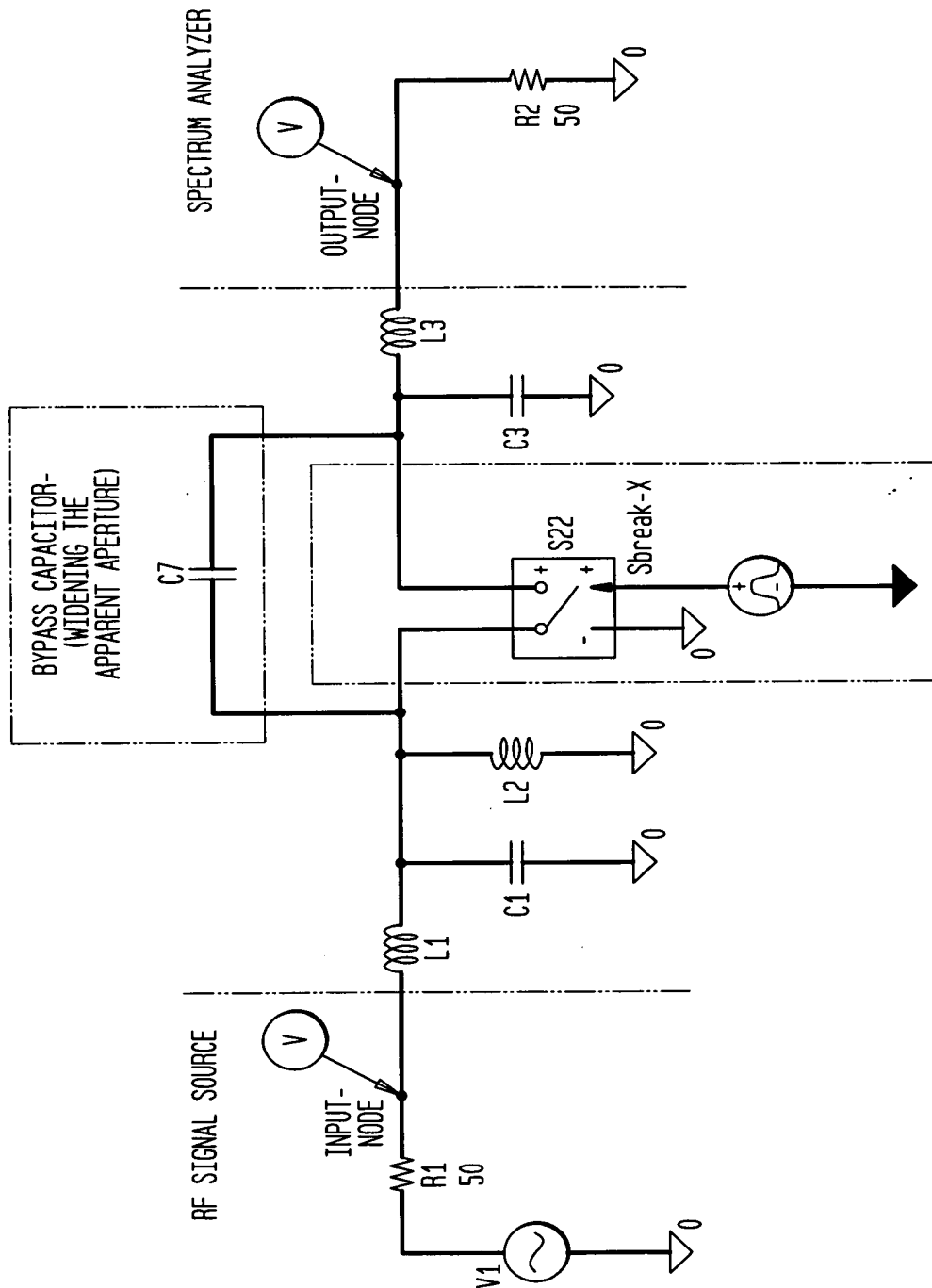
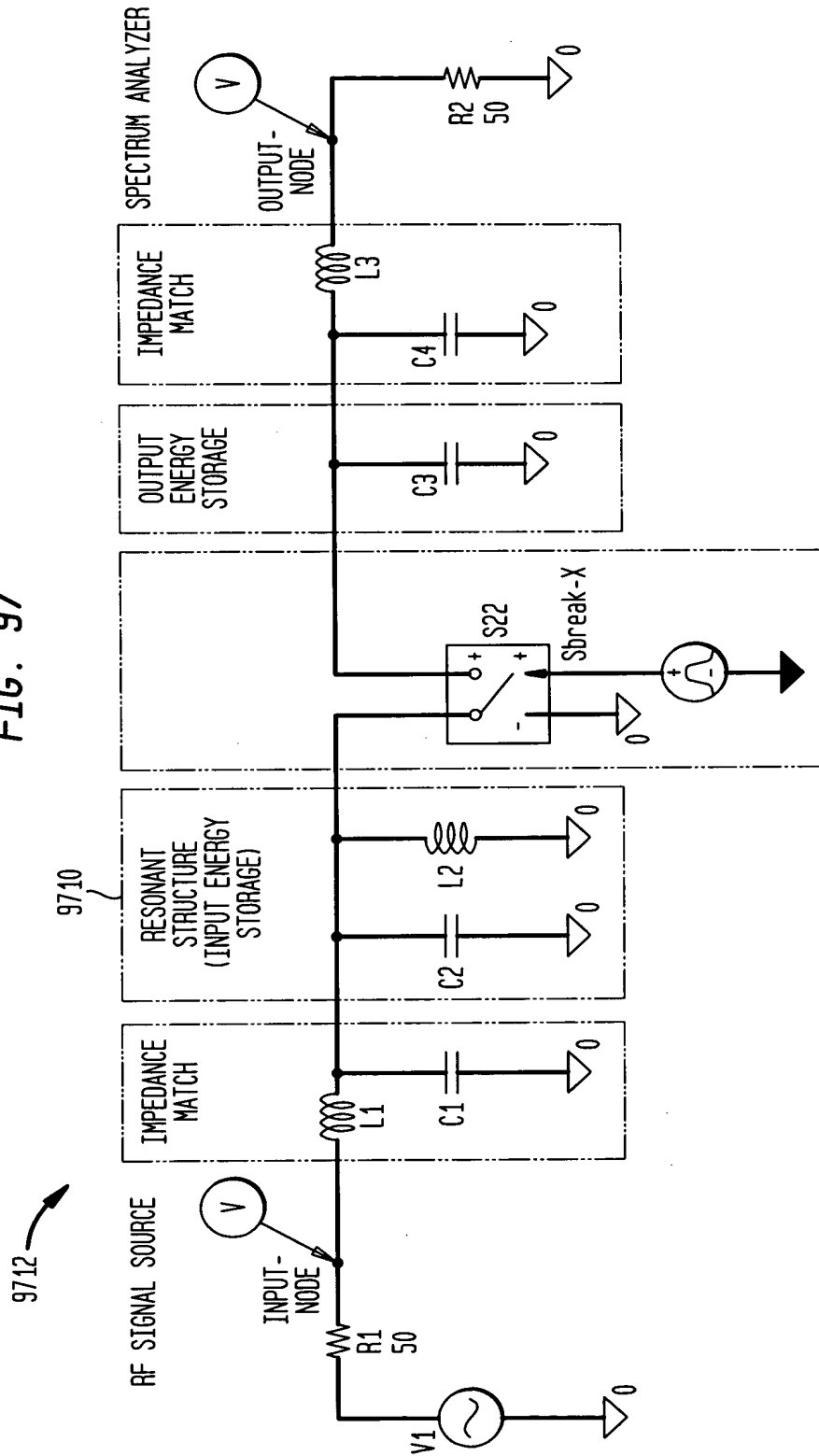
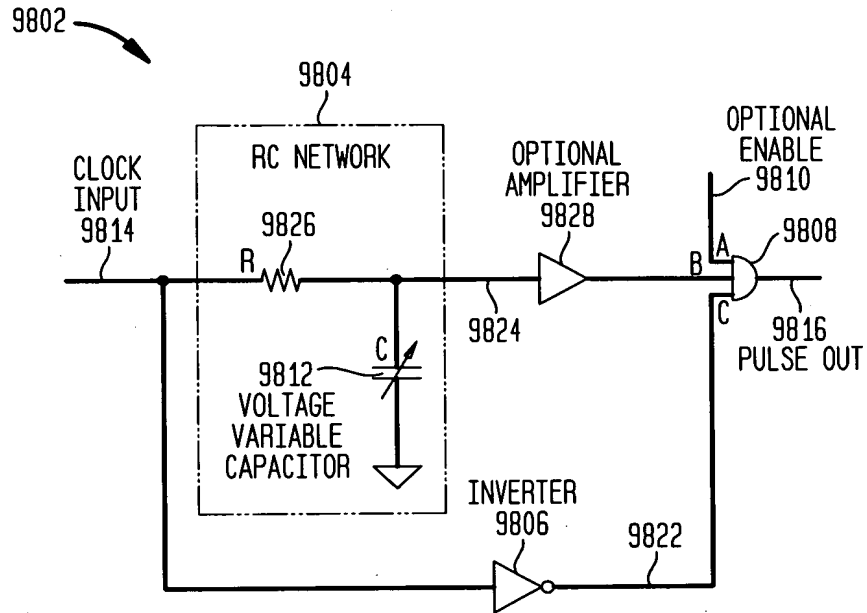
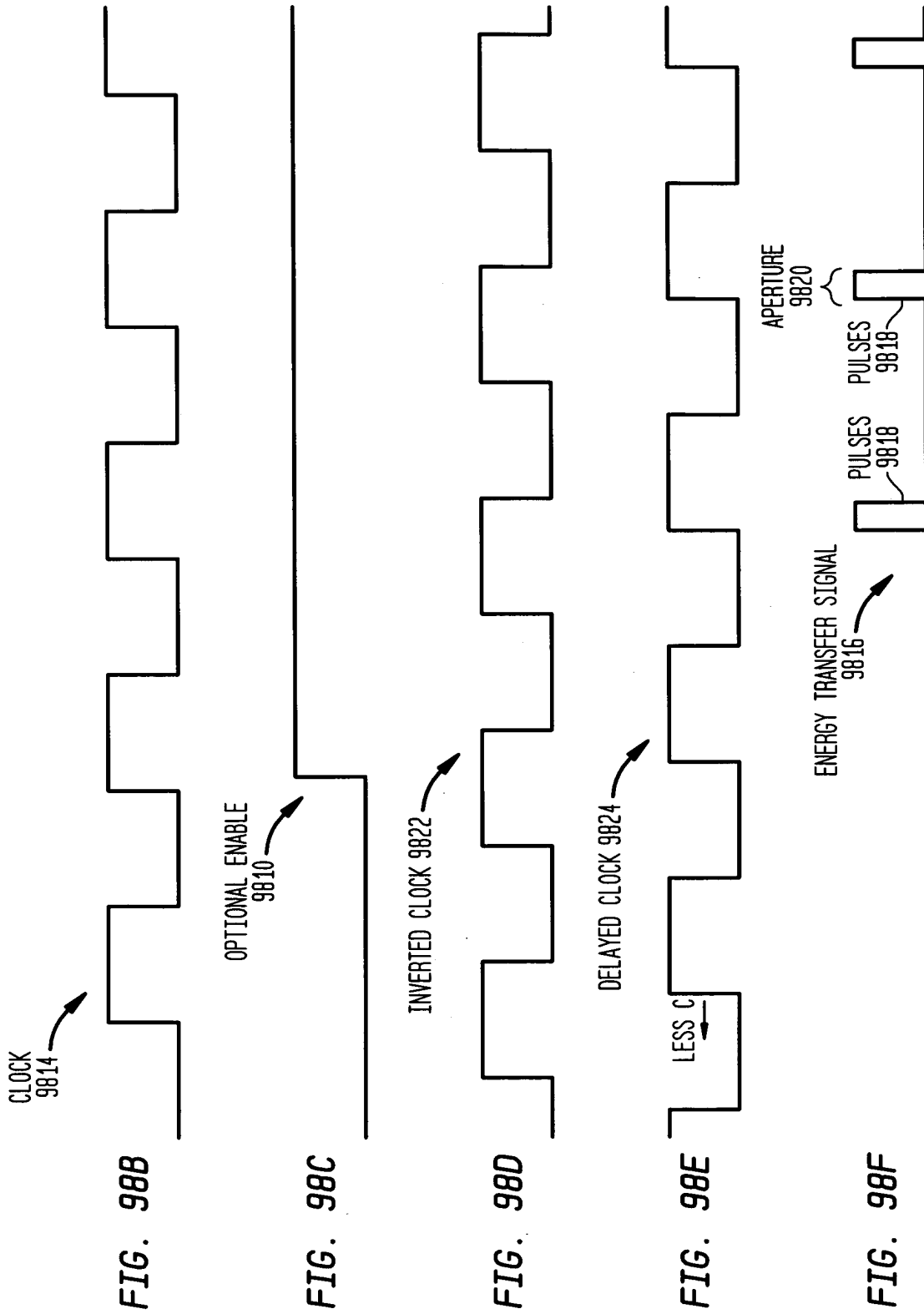


FIG. 97



**FIG. 98A**





**FIG. 99**

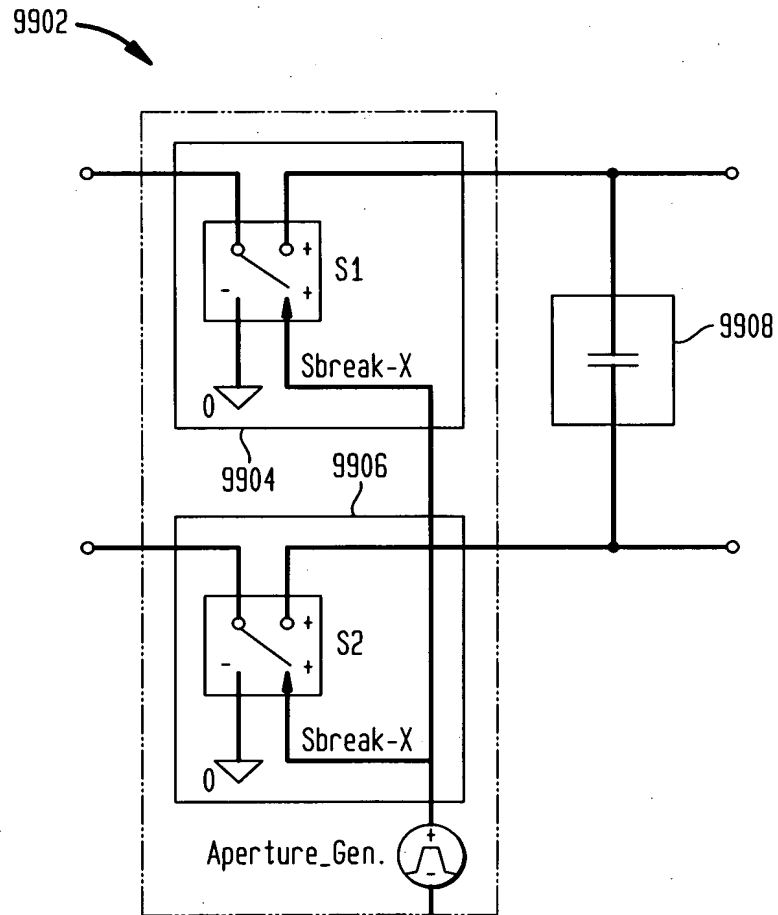


FIG. 100

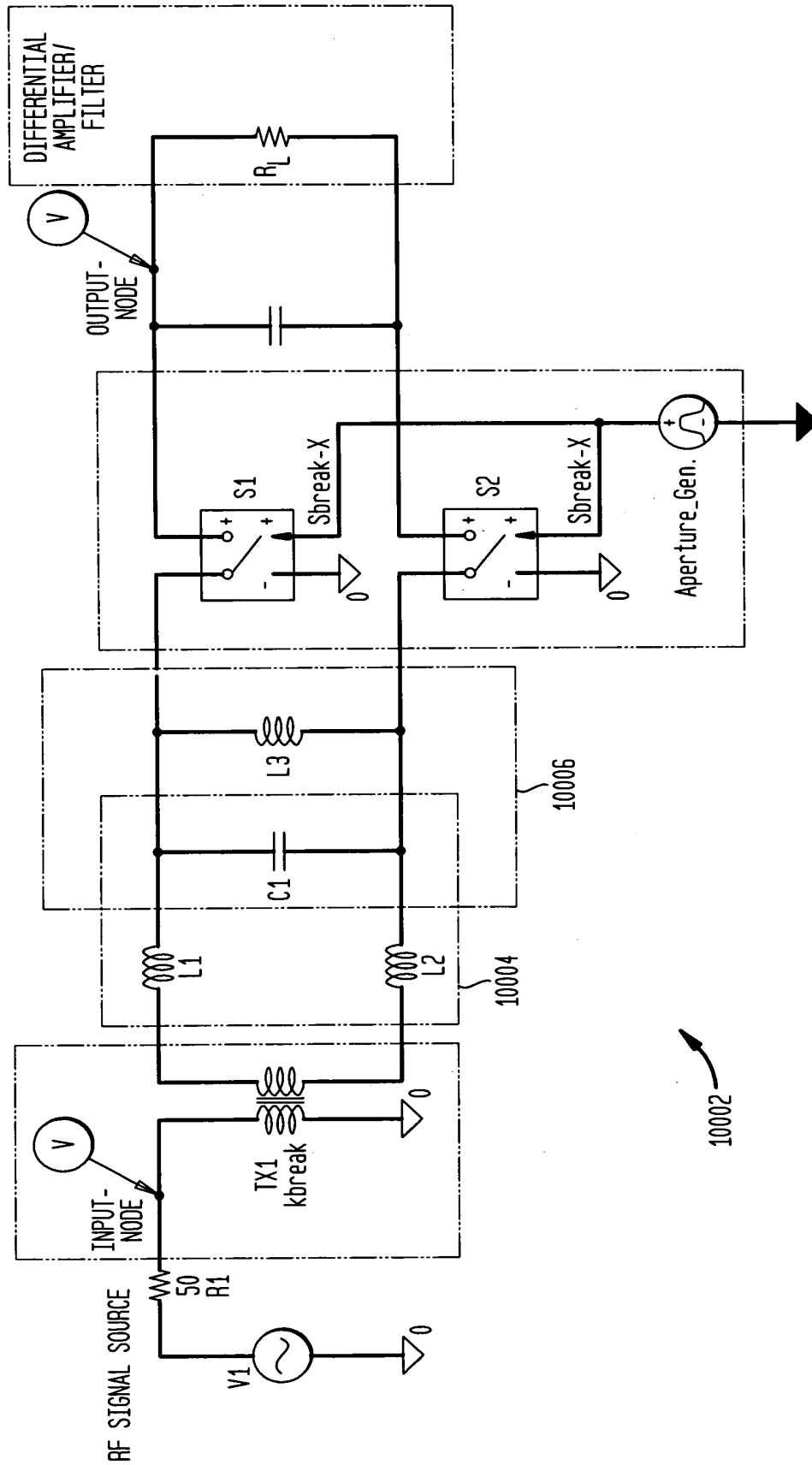


FIG. 101

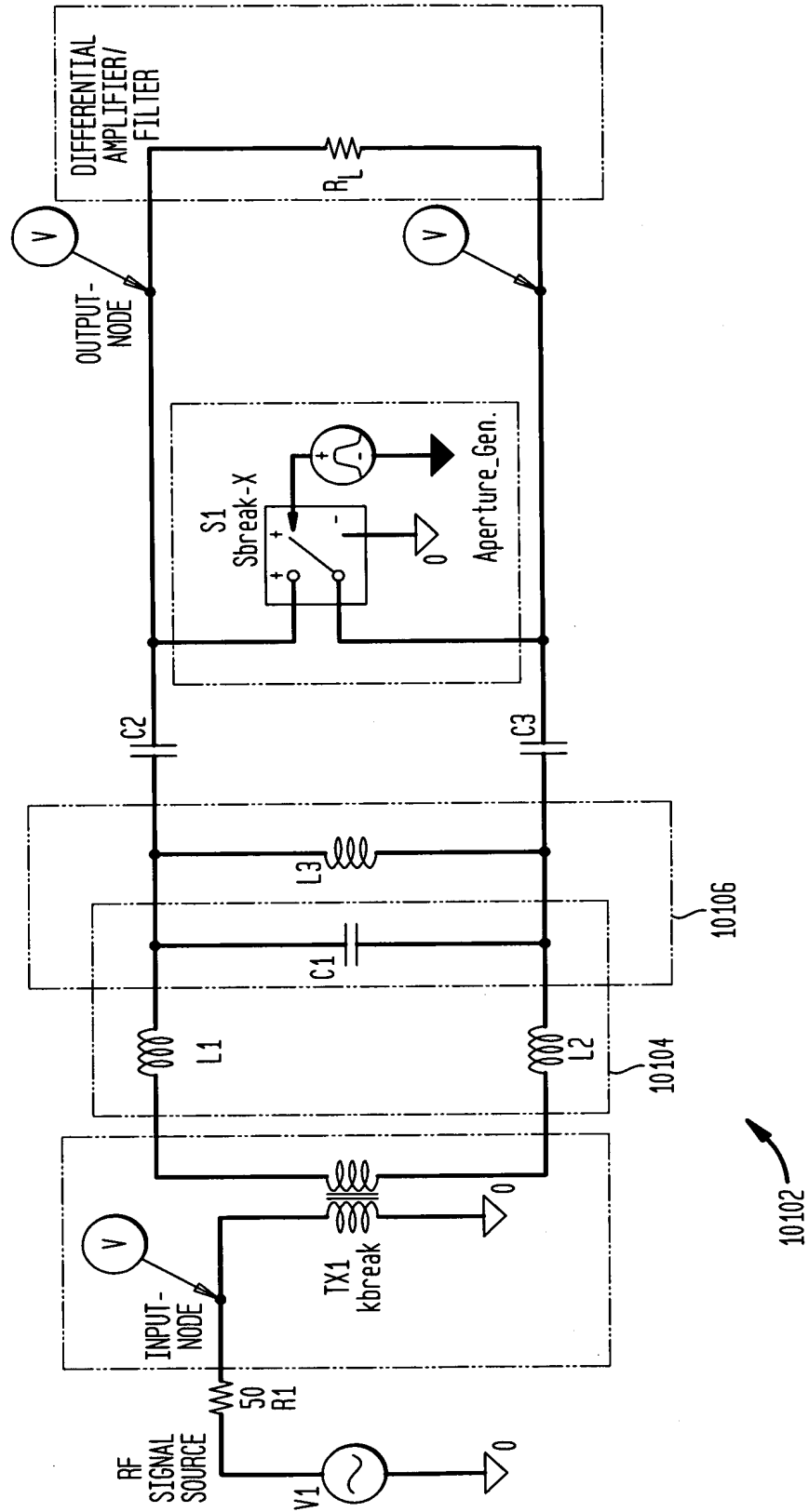


FIG. 102

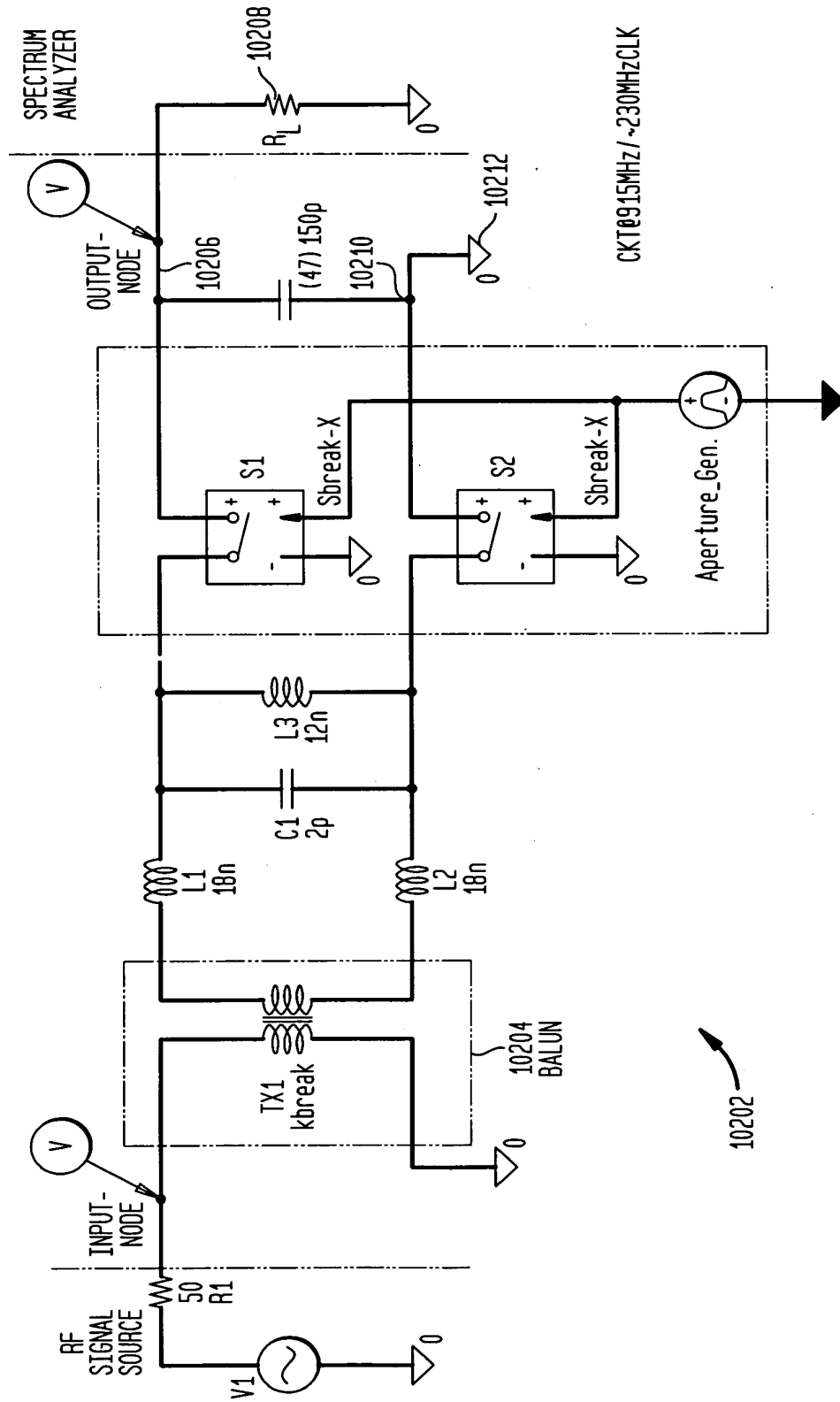


FIG. 103

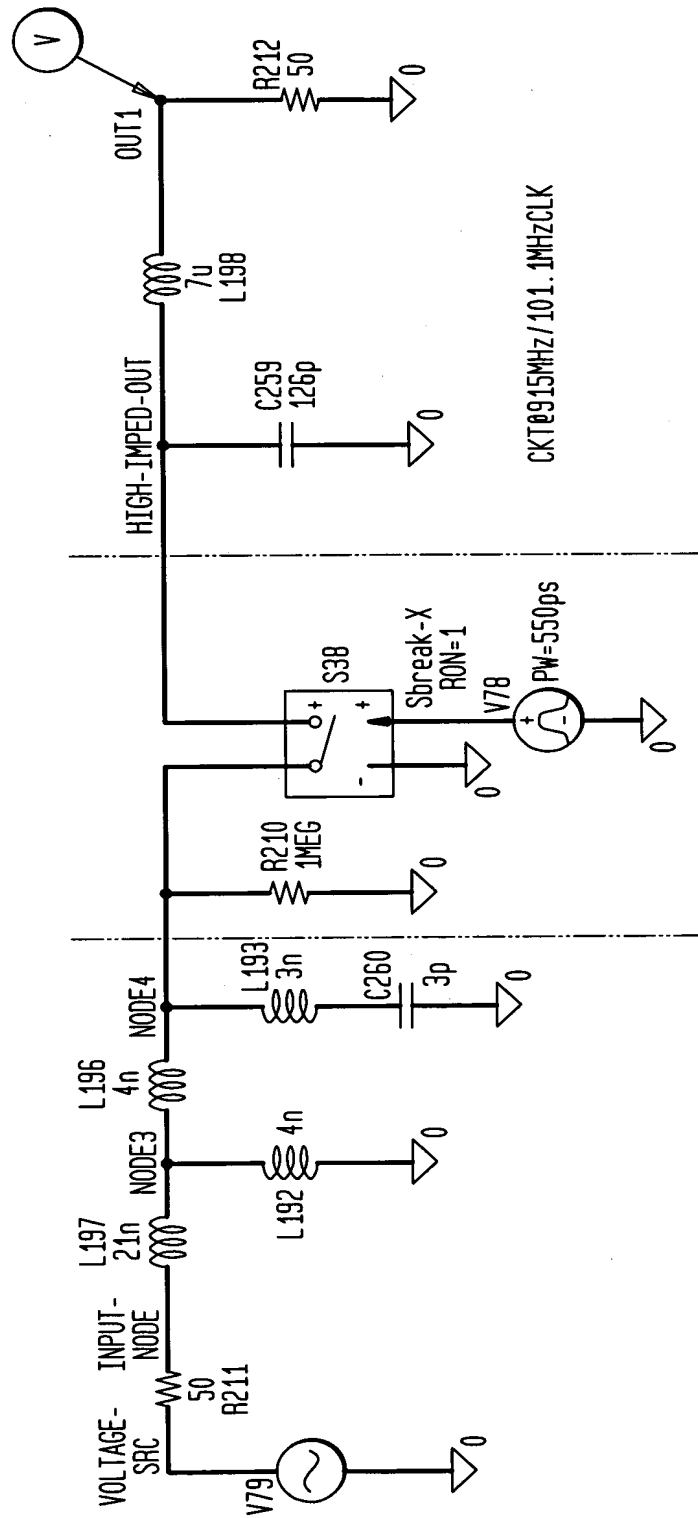


FIG. 104

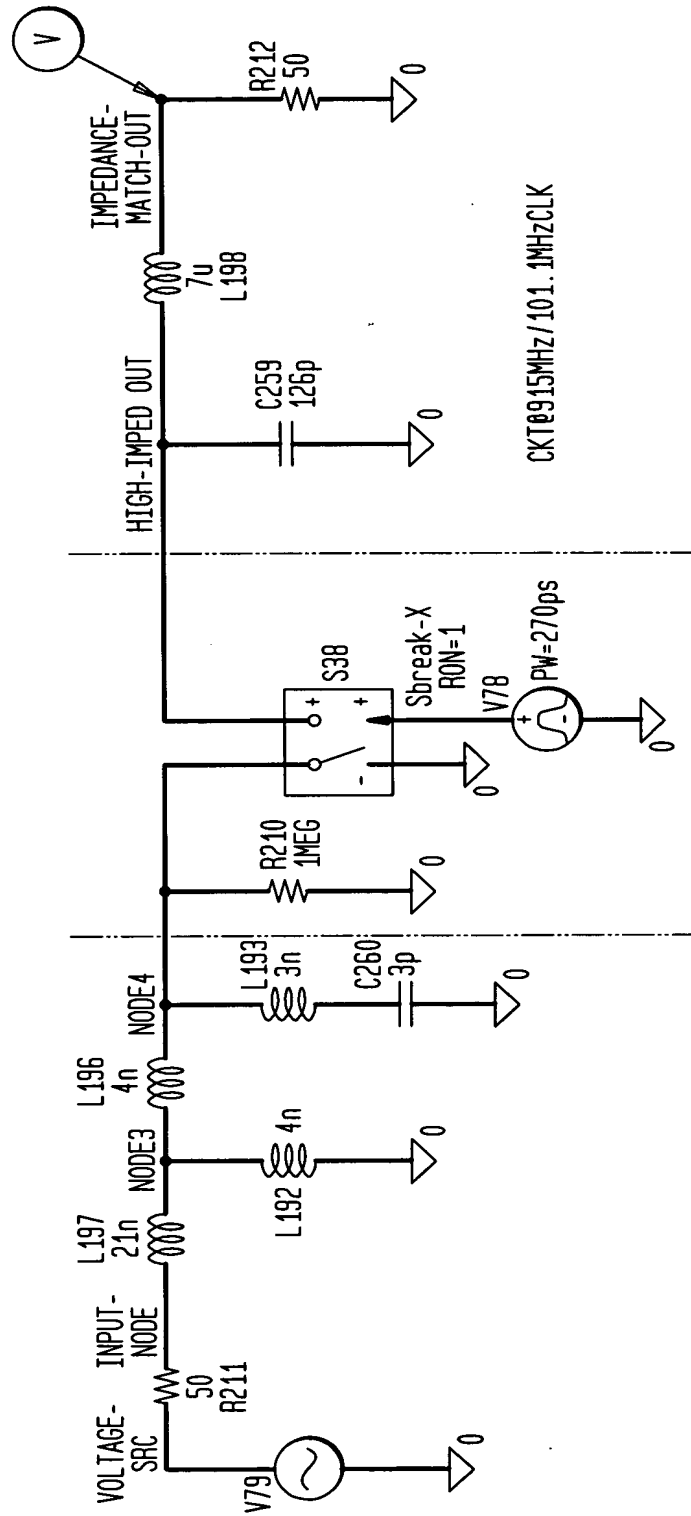


FIG. 105

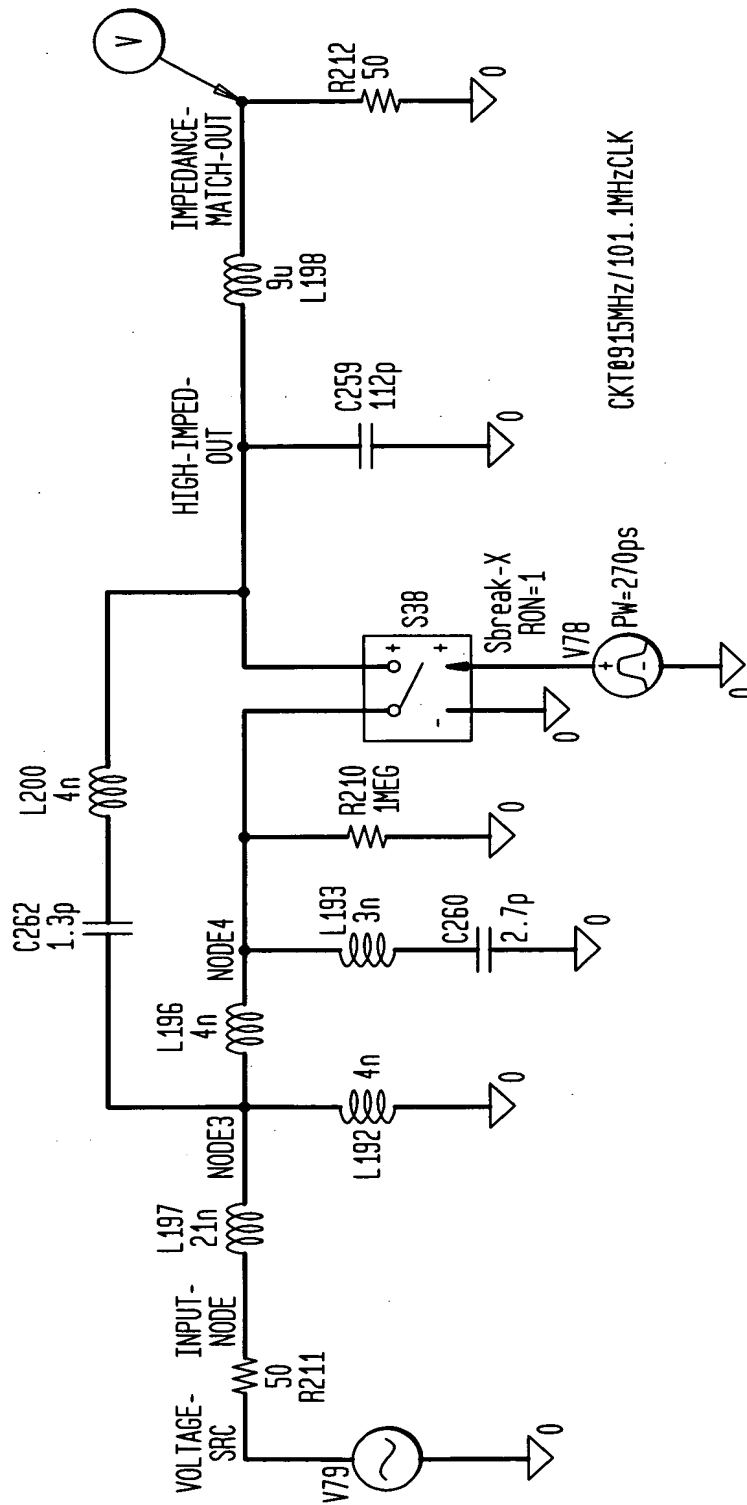


FIG. 106

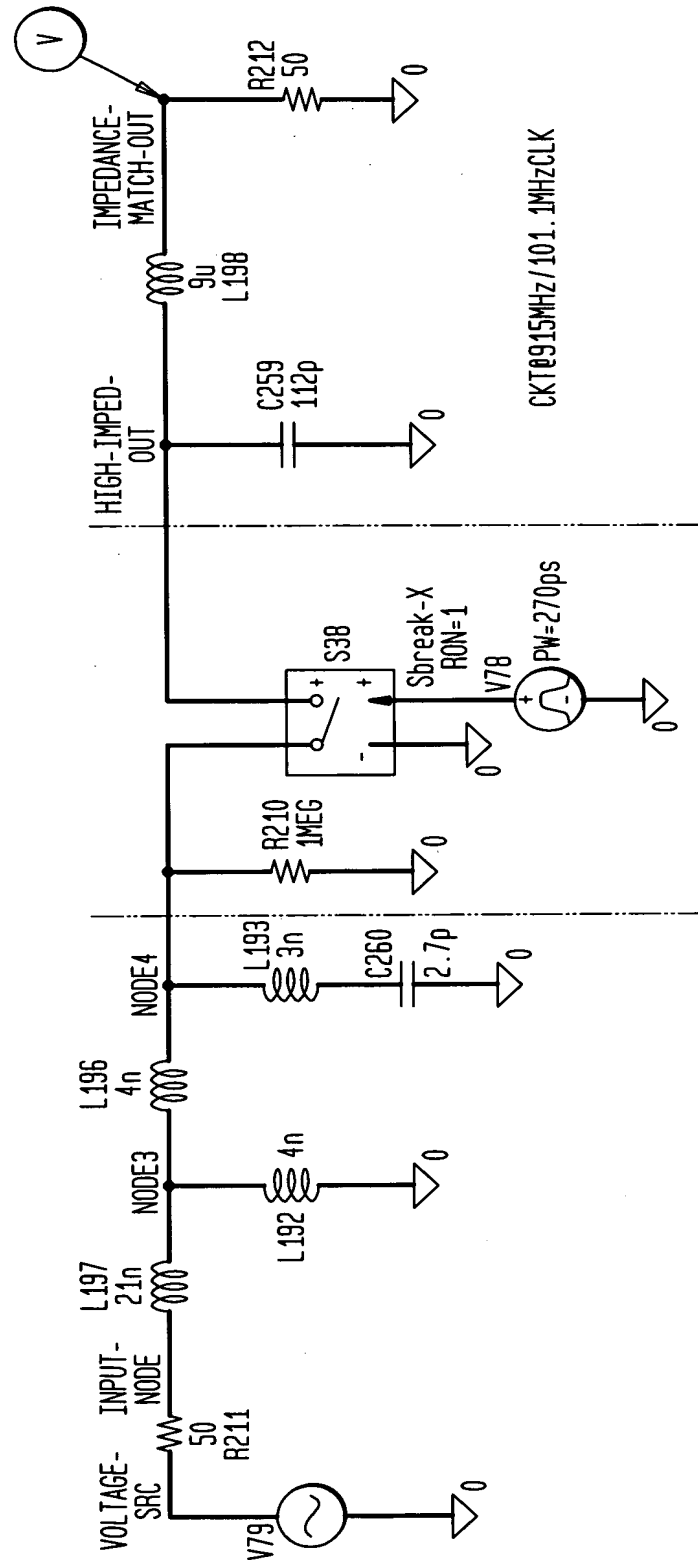
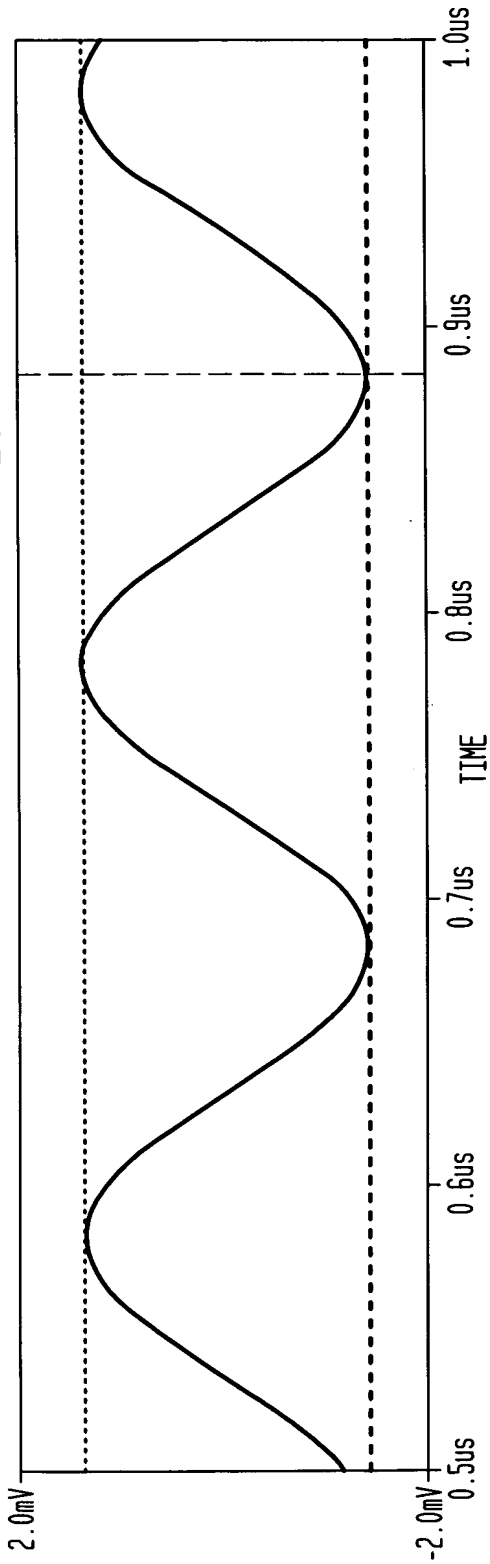


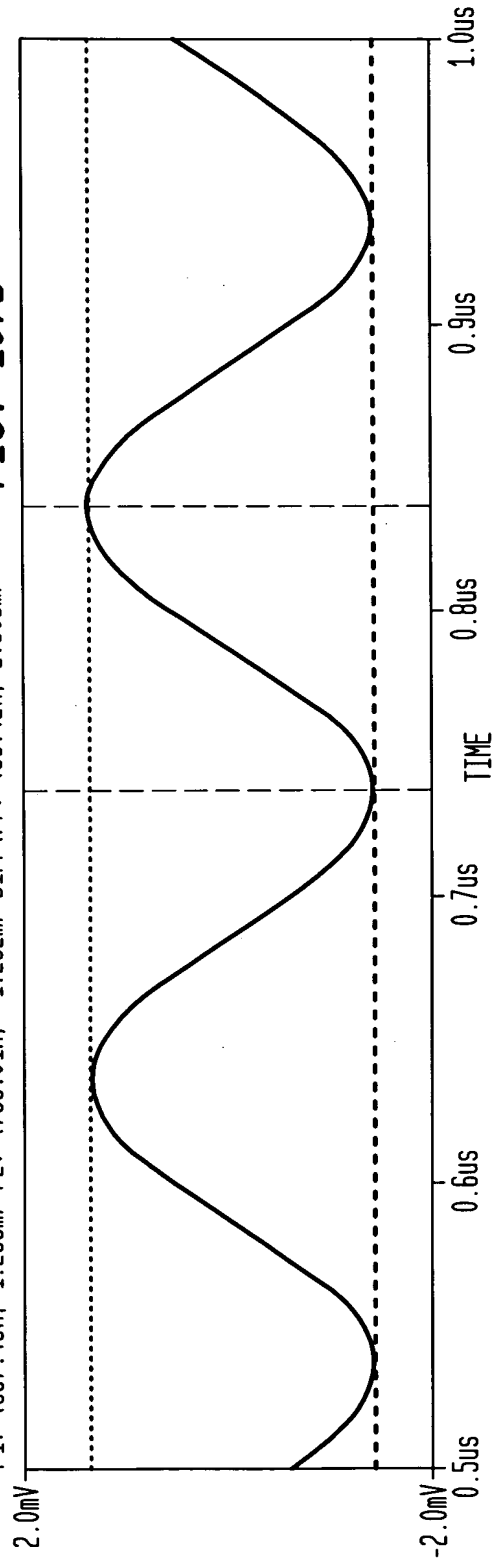
FIG. 107A



V(out1)

E1: (981.86n, 1.404m) E2: (883.04n, -1.402m) DIFF(E): (98.82n, 2.806m)  
F1: (837.43n, 1.253m) F2: (738.01n, -1.252m) DIFF(F): (99.42n, 2.505m)

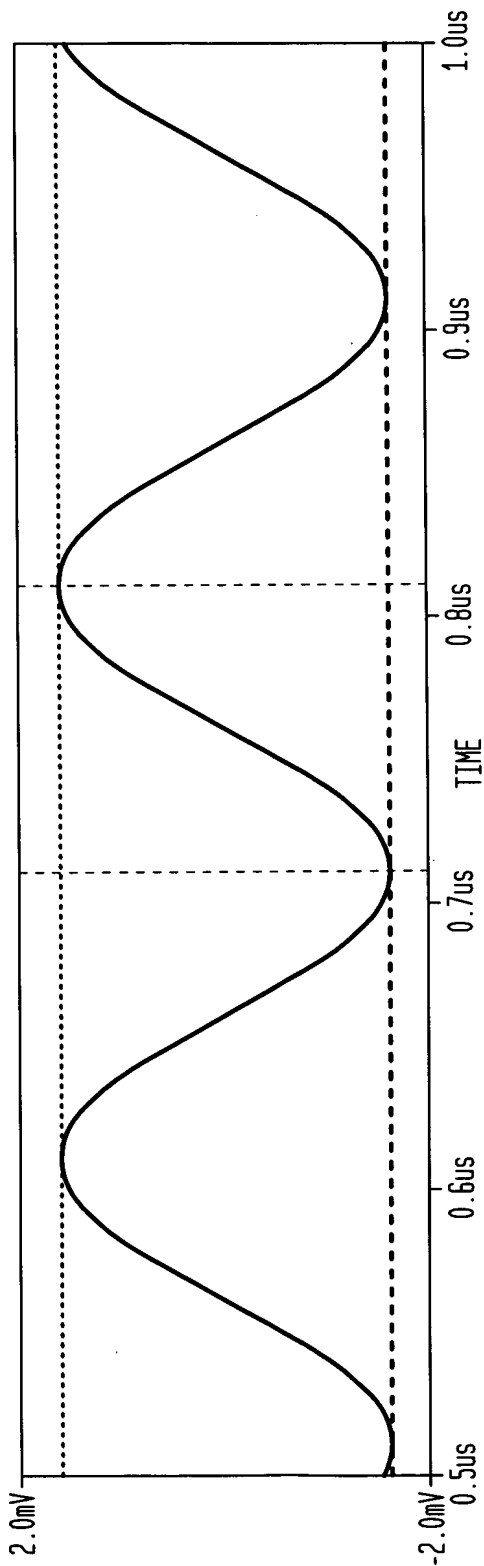
FIG. 107B



V(impedance-match-out)

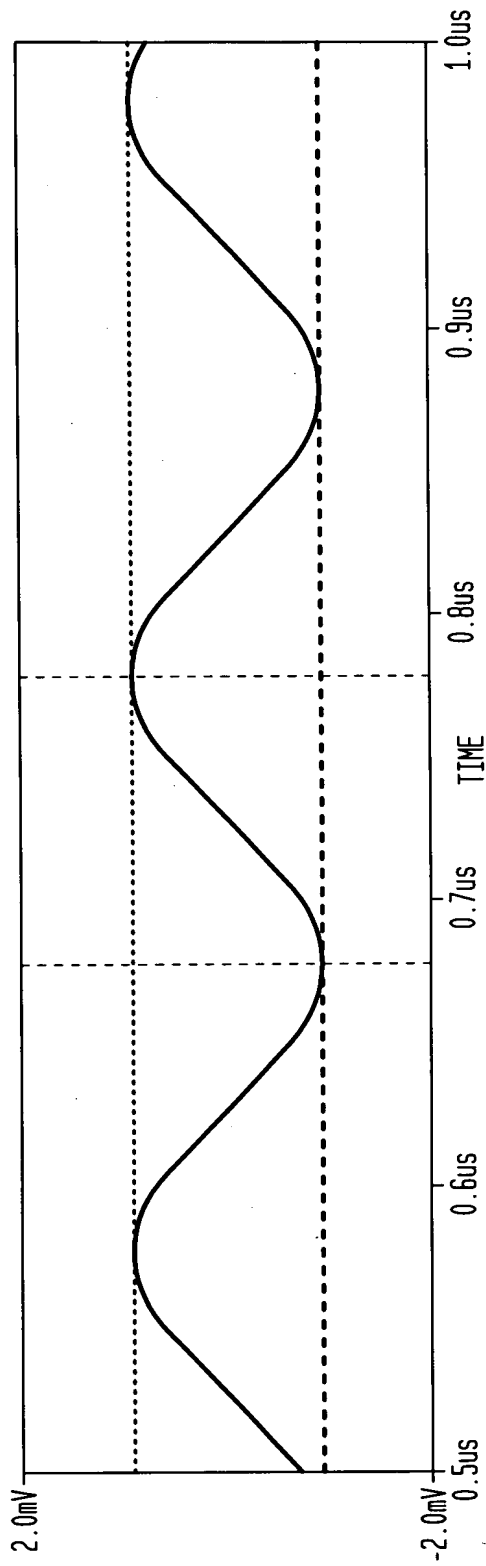
E1: (981.86n, 1.404m) E2: (883.04n, -1.402m) DIFF(E): (98.82n, 2.806m)  
F1: (837.43n, 1.253m) F2: (738.01n, -1.252m) DIFF(F): (99.42n, 2.505m)

FIG. 108A



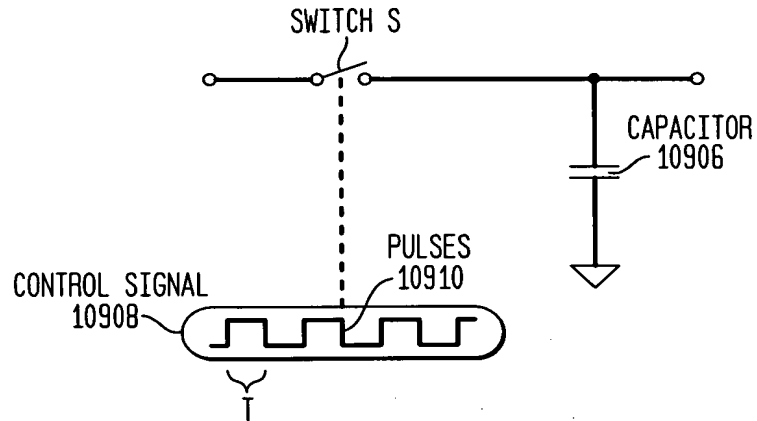
□ V(impedance-match-out)  
 A1: (810.53n, 1.642m) A2: (710.52n, -1.621m) DIFF(A): (100.01n, 3.263m)  
 B1: (777.78n, 942.32u) B2: (677.18n, -942.51u) DIFF(B): (100.60n, 1.885m)

FIG. 108B



□ V(impedance-match-out)  
 A1: (810.53n, 1.642m) A2: (710.52n, -1.621m) DIFF(A): (100.01n, 3.263m)  
 B1: (777.78n, 942.32u) B2: (677.18n, -942.51u) DIFF(B): (100.60n, 1.885m)

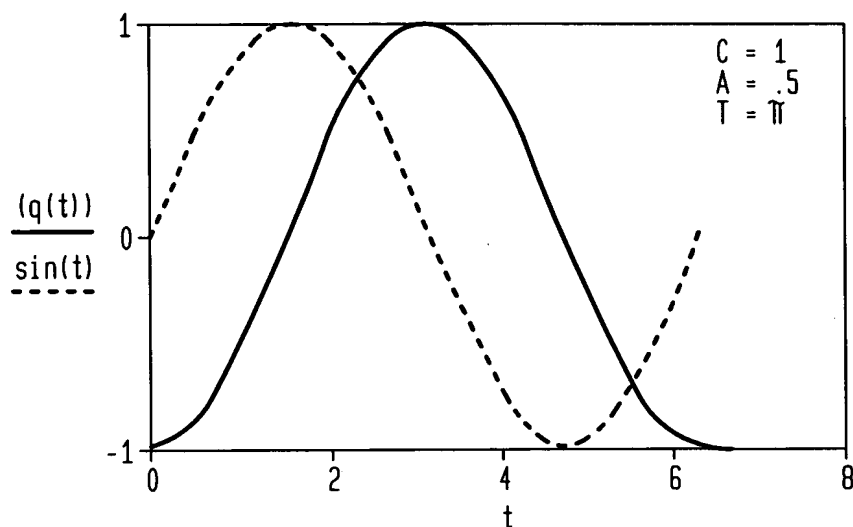
**FIG. 109A**



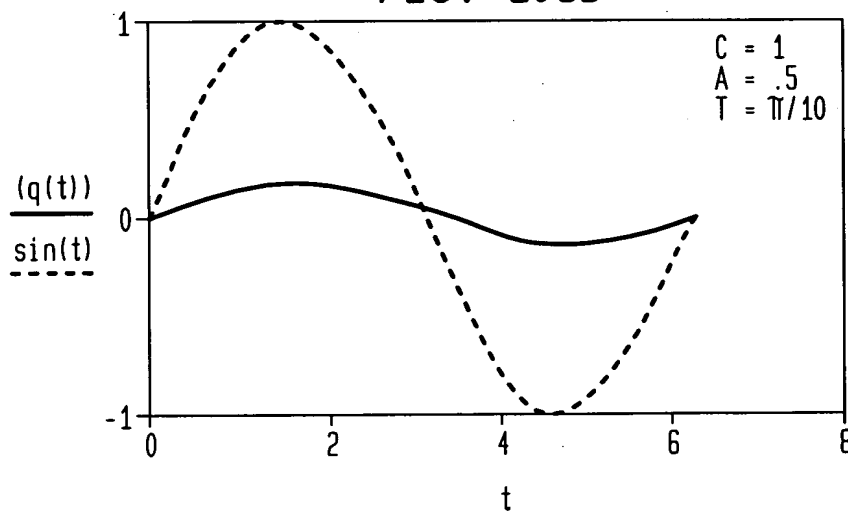
**FIG. 109B**

$q = C \cdot V$	EQ. 10
$V = A \cdot \sin(t)$	EQ. 11
$q(t) = C \cdot A \cdot \sin(t)$	EQ. 12
$\Delta q(t) = C \cdot A \cdot \sin(t) - C \cdot A \cdot \sin(t-T)$	EQ. 13
$\Delta q(t) = C \cdot A \cdot (\sin(t) - \sin(t-T))$	EQ. 14
$\sin(\alpha) - \sin(\beta) = 2 \cdot \sin\left(\frac{\alpha - \beta}{2}\right) \cdot \cos\left(\frac{\alpha + \beta}{2}\right)$	EQ. 15
$\Delta q(t) = 2 \cdot C \cdot A \cdot \sin\left[\frac{t - (t-T)}{2}\right] \cdot \cos\left[\frac{t + (t-T)}{2}\right]$	EQ. 16
$\Delta q(t) = 2 \cdot C \cdot A \cdot \sin\left(\frac{1}{2} \cdot T\right) \cdot \cos\left(t - \frac{1}{2} \cdot T\right)$	EQ. 17
$q(t) = \int C \cdot A \cdot (\sin(t) - \sin(t-T)) dt$	EQ. 18
$q(t) = -\cos(t) \cdot C \cdot A + \cos(t-T) \cdot C \cdot A$	EQ. 19
$q(t) = C \cdot A \cdot (\cos(t-T) - \cos(t))$	EQ. 20

**FIG. 109C**



**FIG. 109D**



**FIG. 109E**

**POWER-CHARGE RELATIONSHIP**

$q = C \cdot V$	EQ. 21
$V = q/C$	EQ. 22
$V = J/C$	EQ. 23
$J = q^2/C$	EQ. 24
$P = J/S$	EQ. 25
$P = \frac{q^2}{C \cdot S}$	EQ. 26

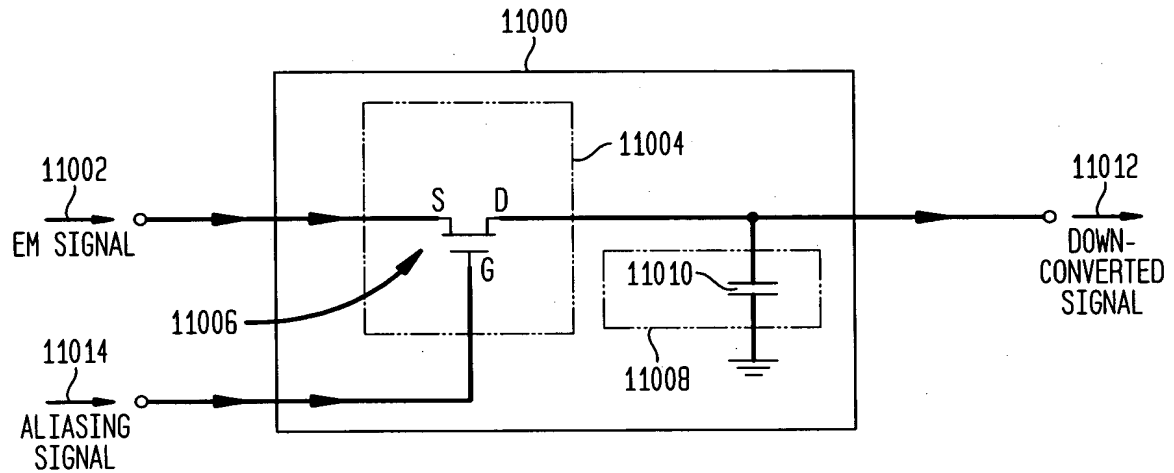
**FIG. 109F**

**INSERTION LOSS**

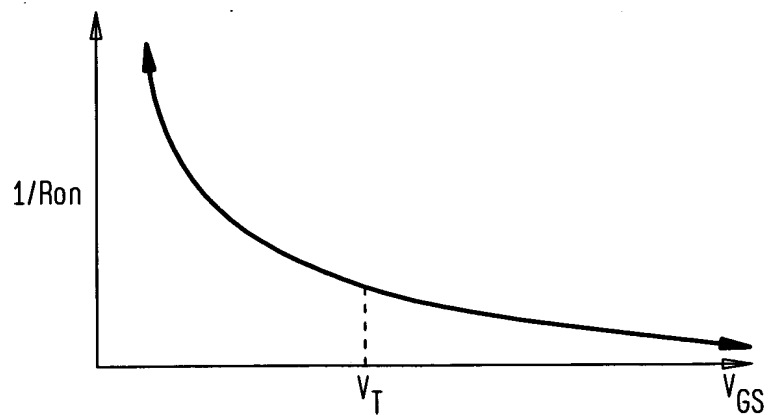
INSERTION LOSS IN dB IS EXPRESSED BY:

$$IL_{dB} = 10 \cdot \log\left(\frac{P_{in}}{P_{out}}\right) \text{ or } 10 \cdot \log\left[\frac{\left(\frac{V_{in}^2}{R_{in}}\right)}{\left(\frac{V_{out}^2}{R_{out}}\right)}\right]$$

**FIG. 110A**



**FIG. 110B**



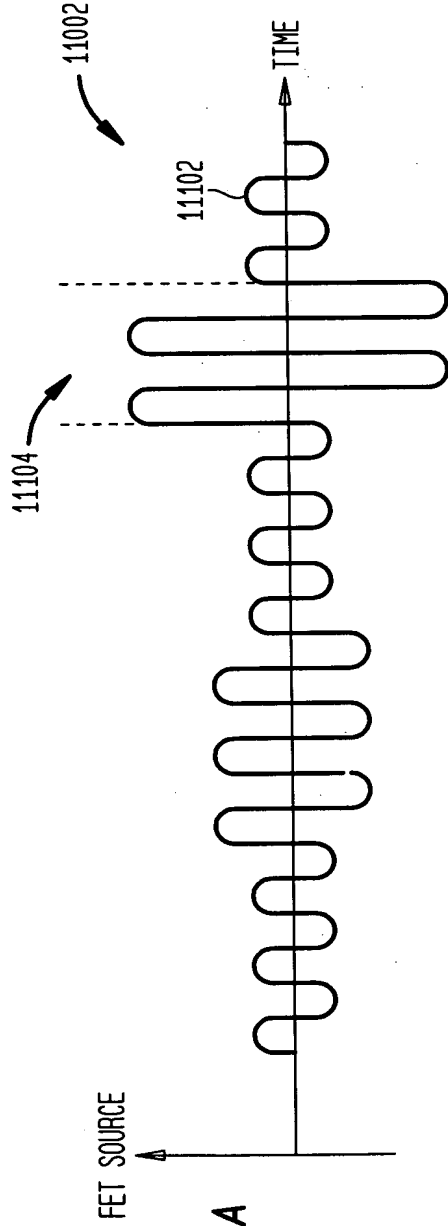


FIG. 111A

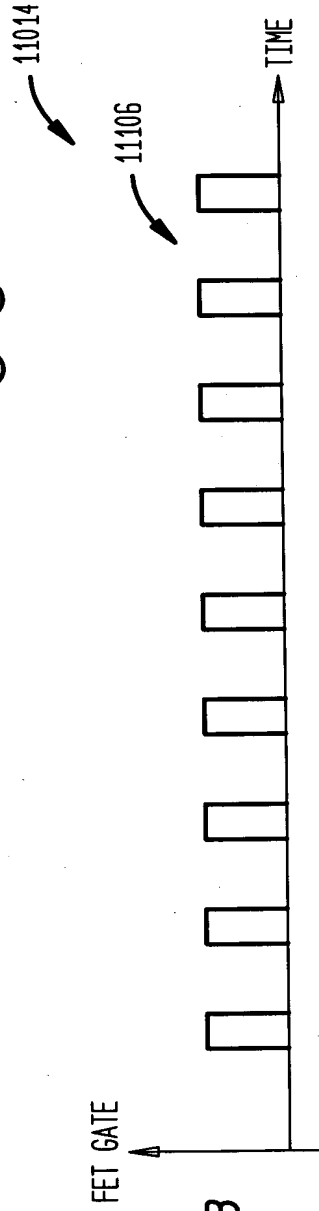


FIG. 111B

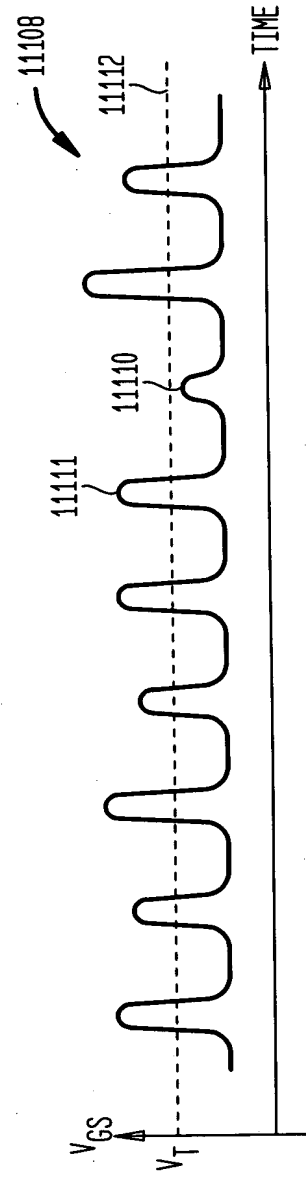
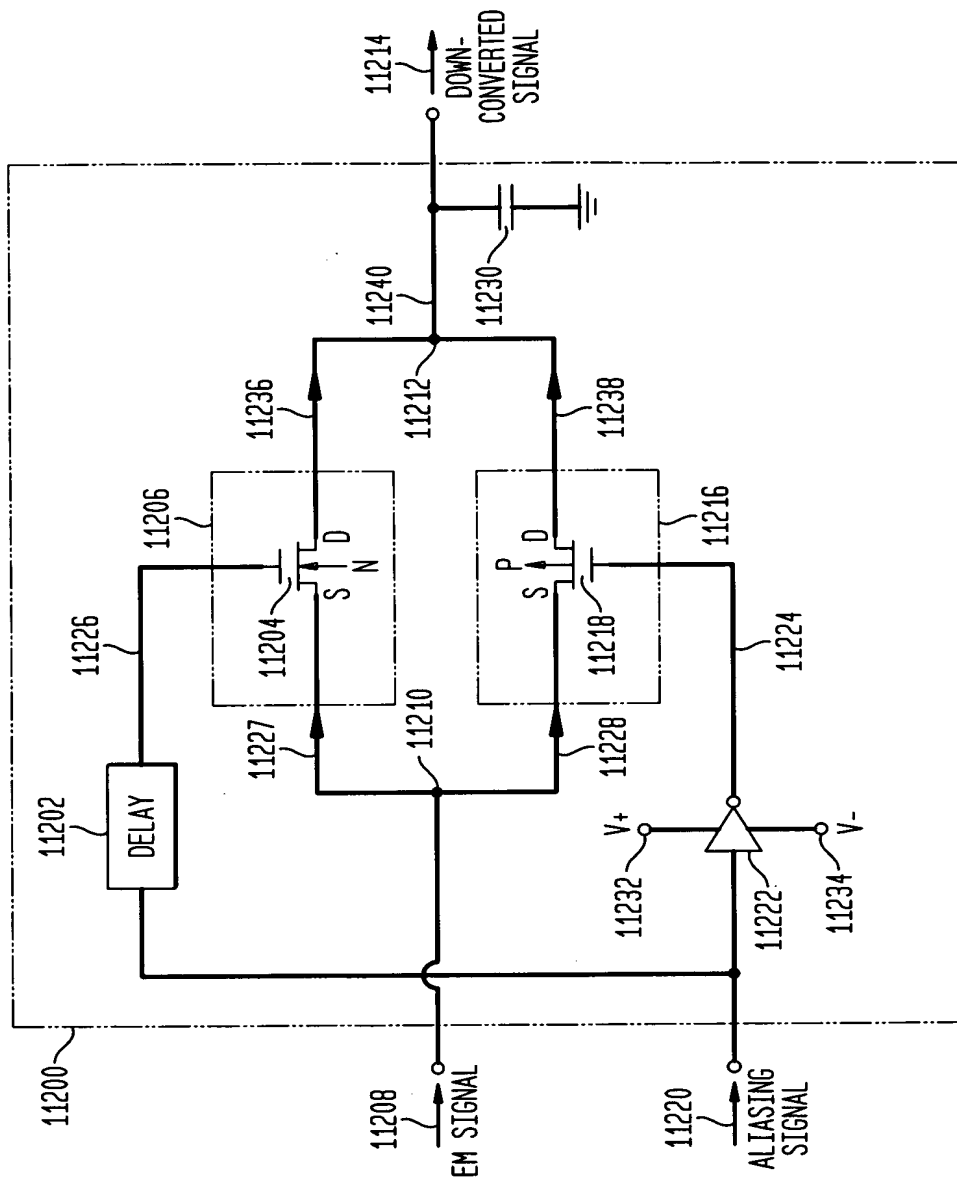
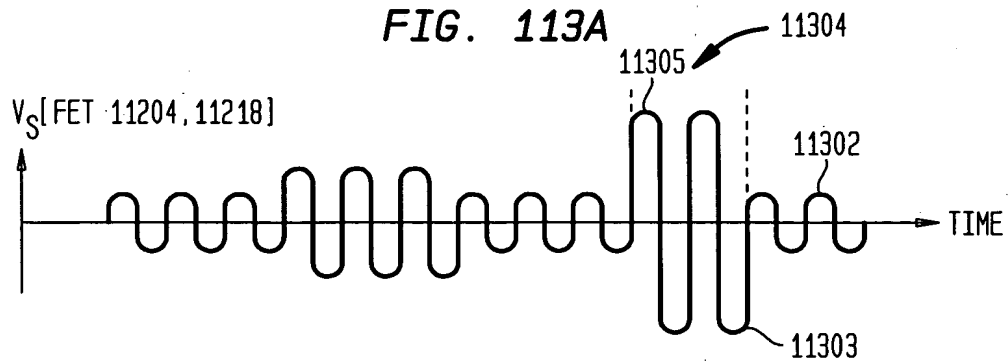


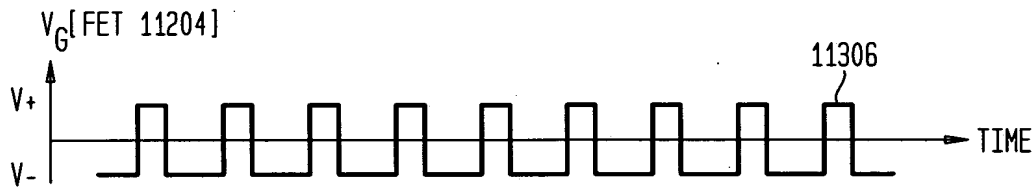
FIG. 111C



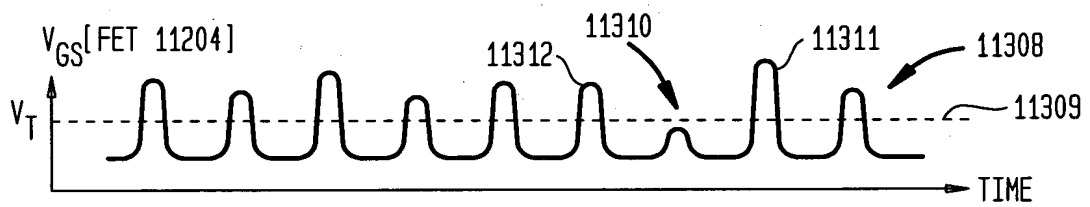
**FIG. 113A**



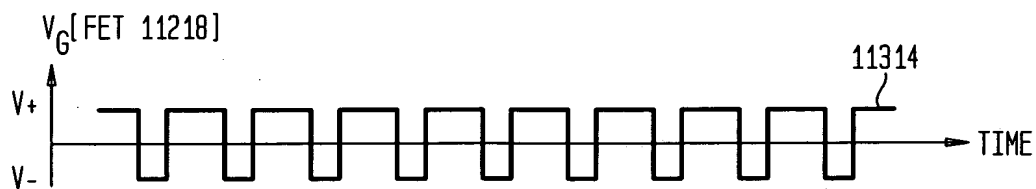
**FIG. 113B**



**FIG. 113C**



**FIG. 113D**



**FIG. 113E**

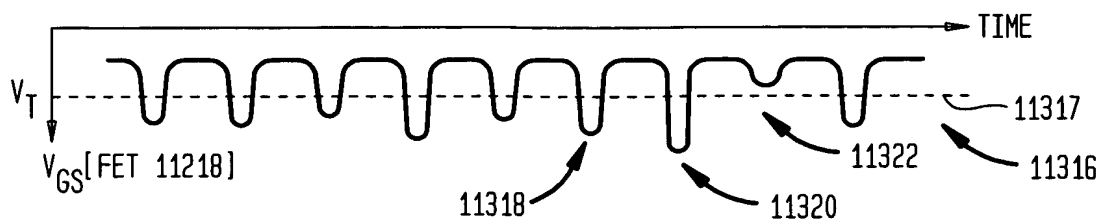


FIG. 114

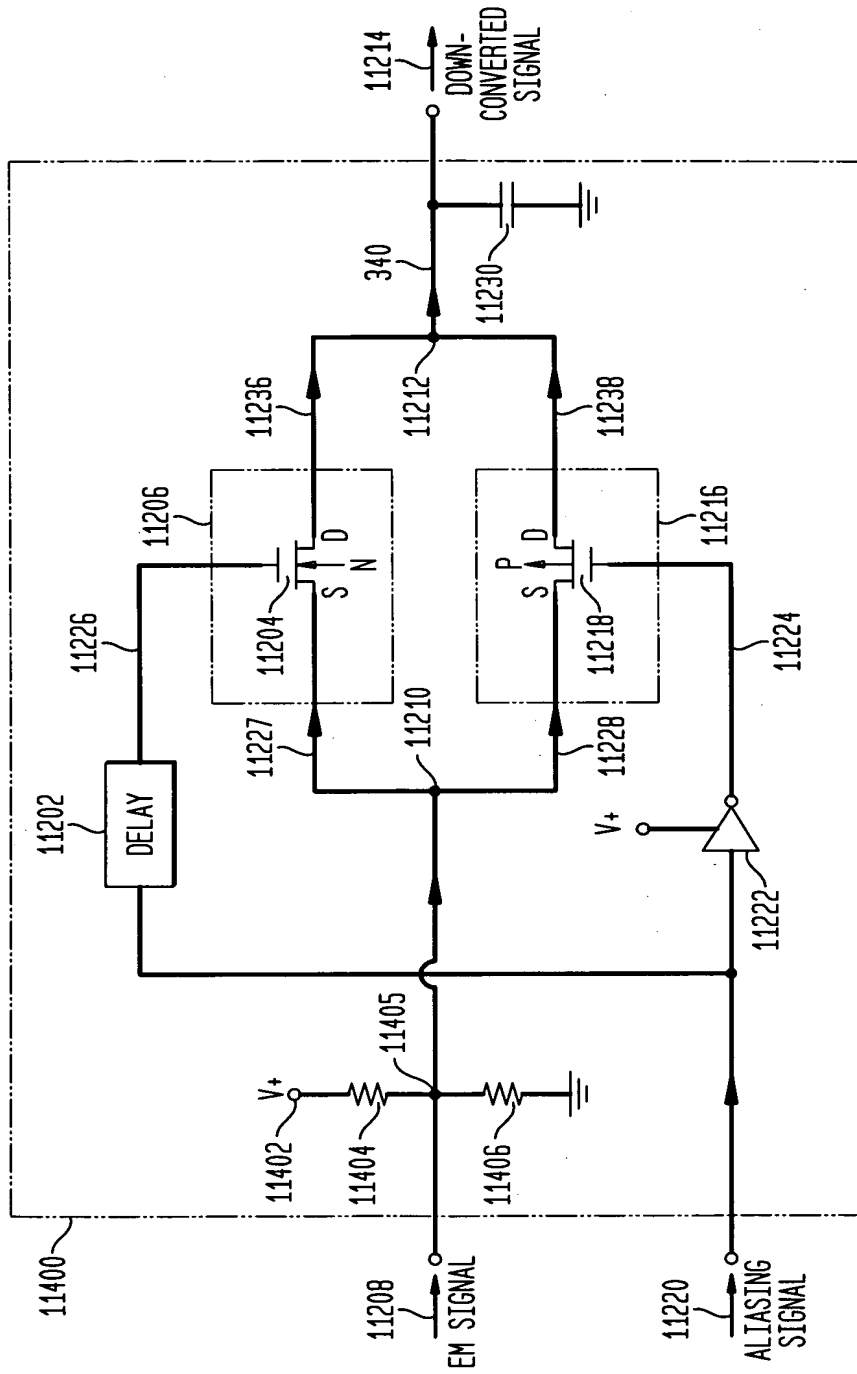
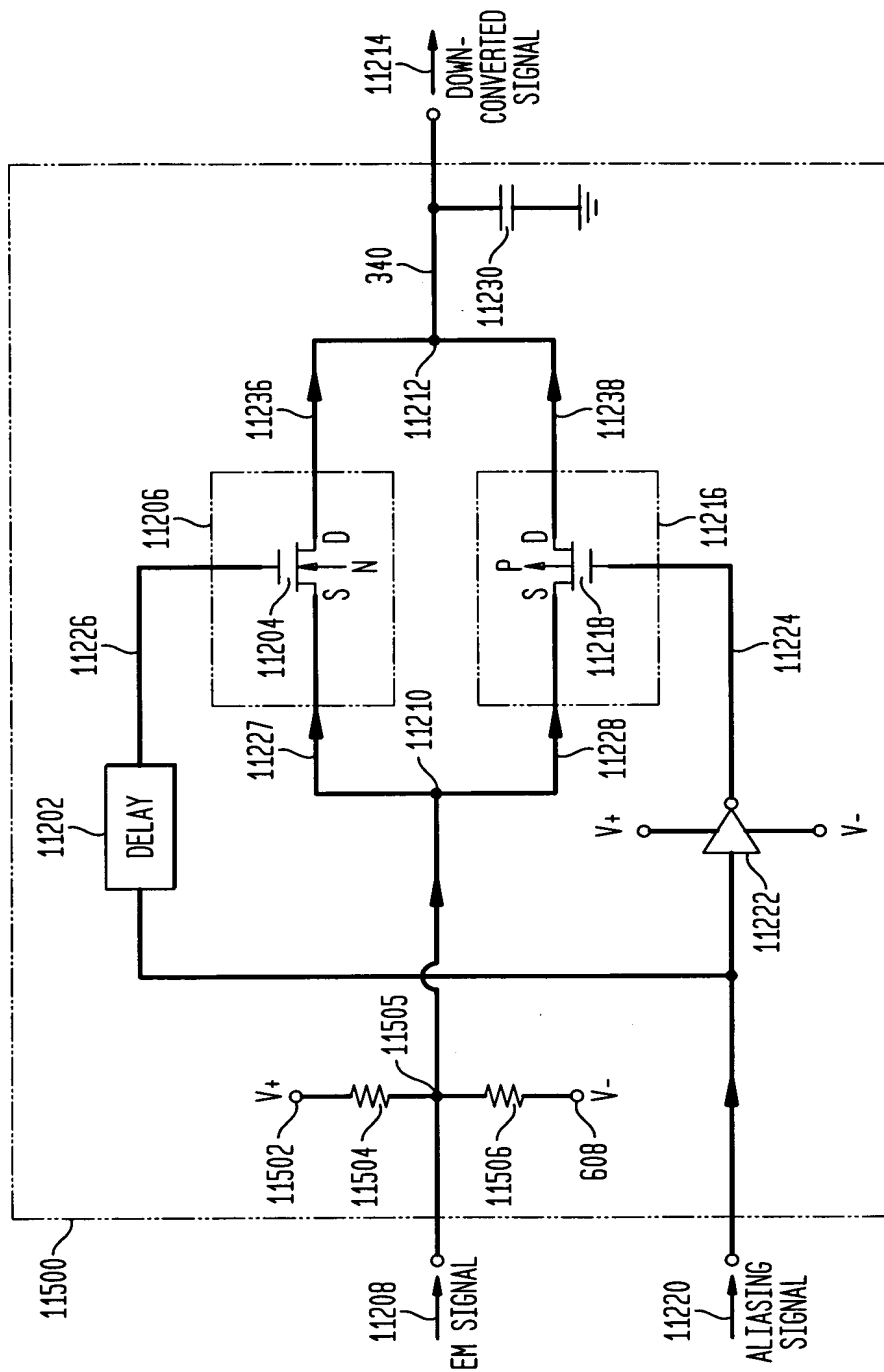
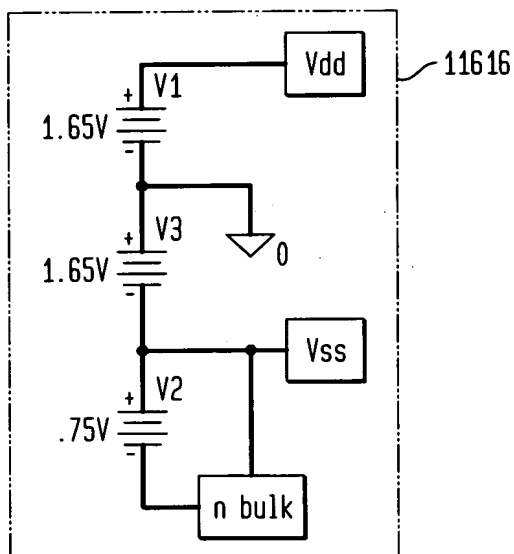
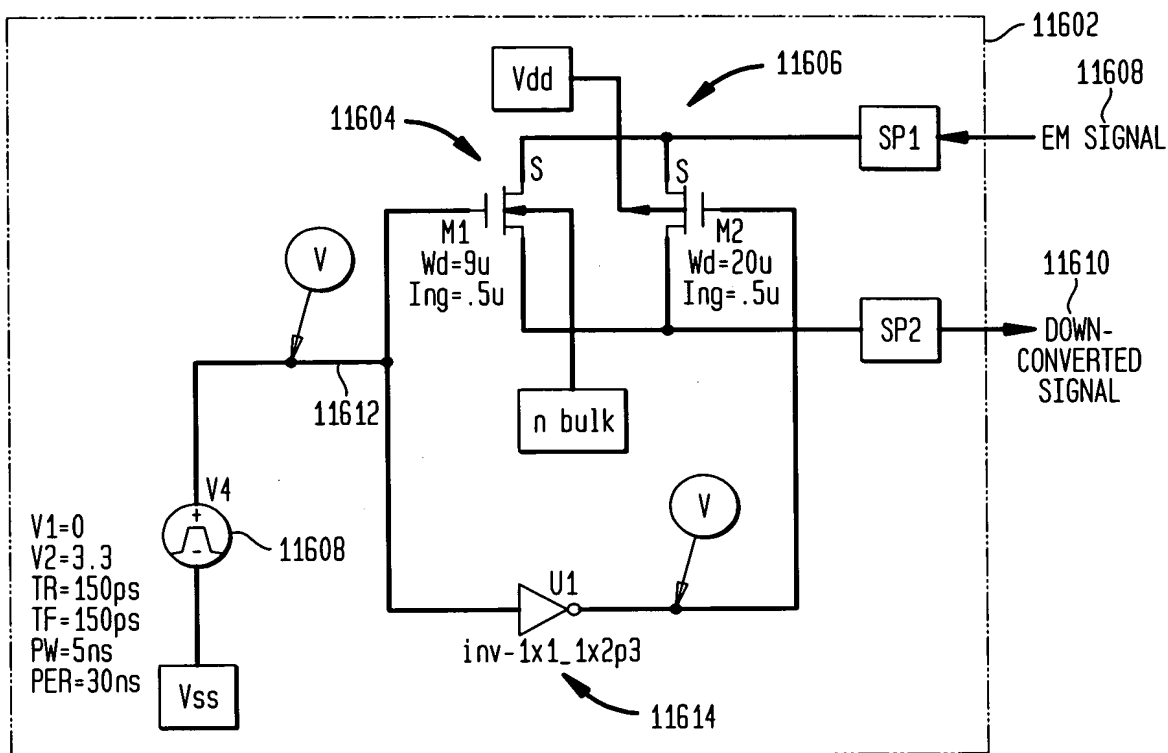
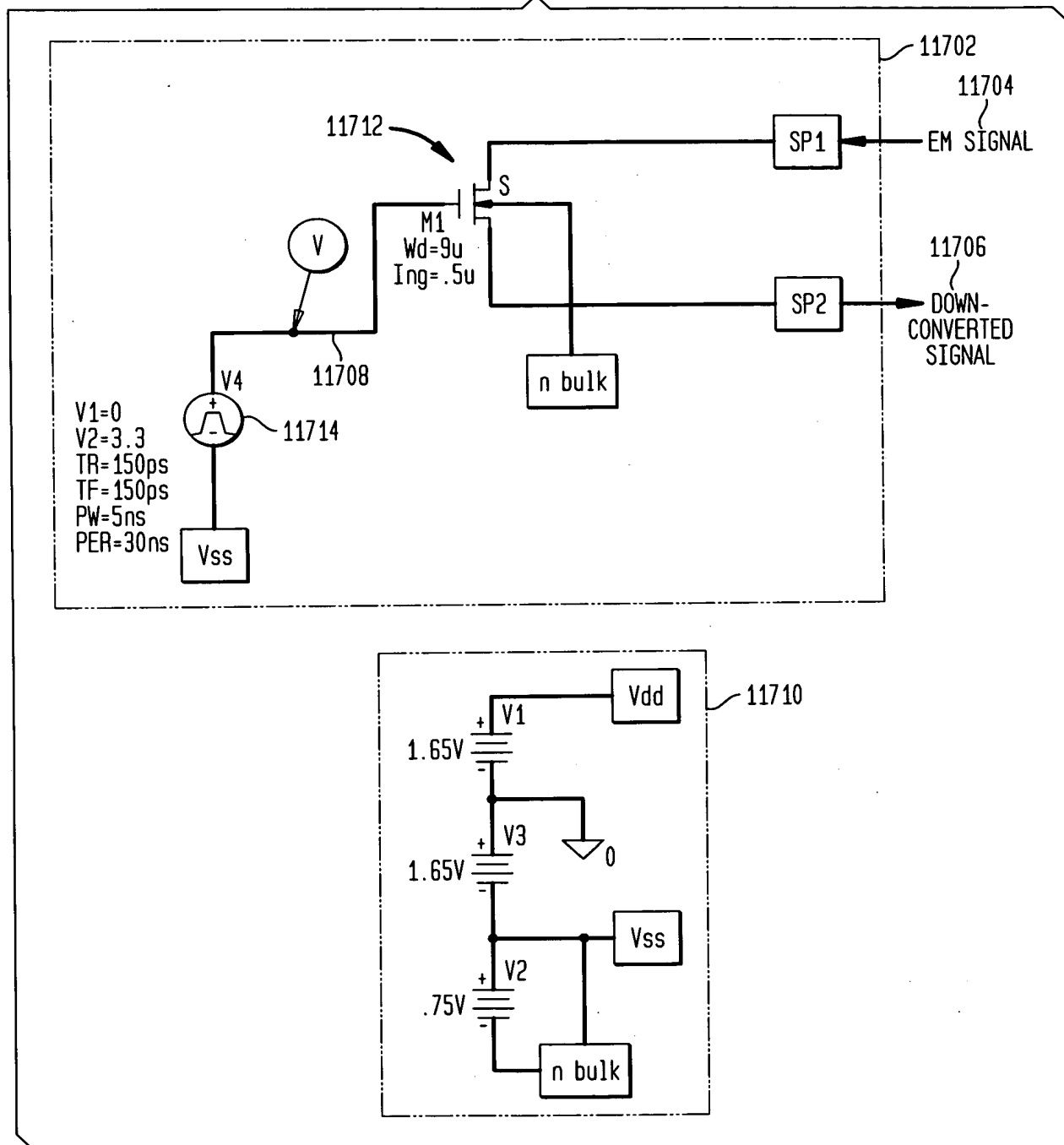


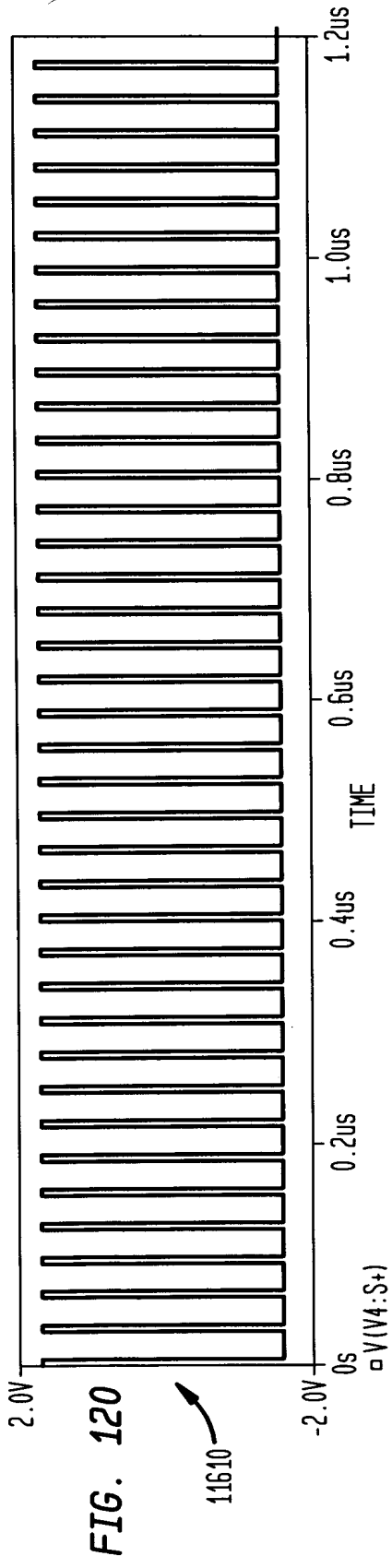
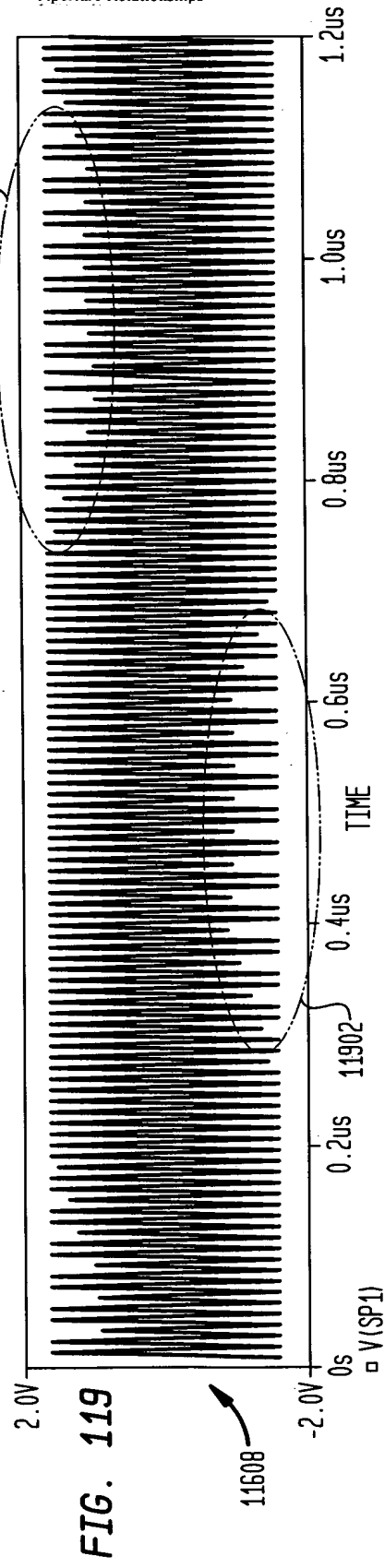
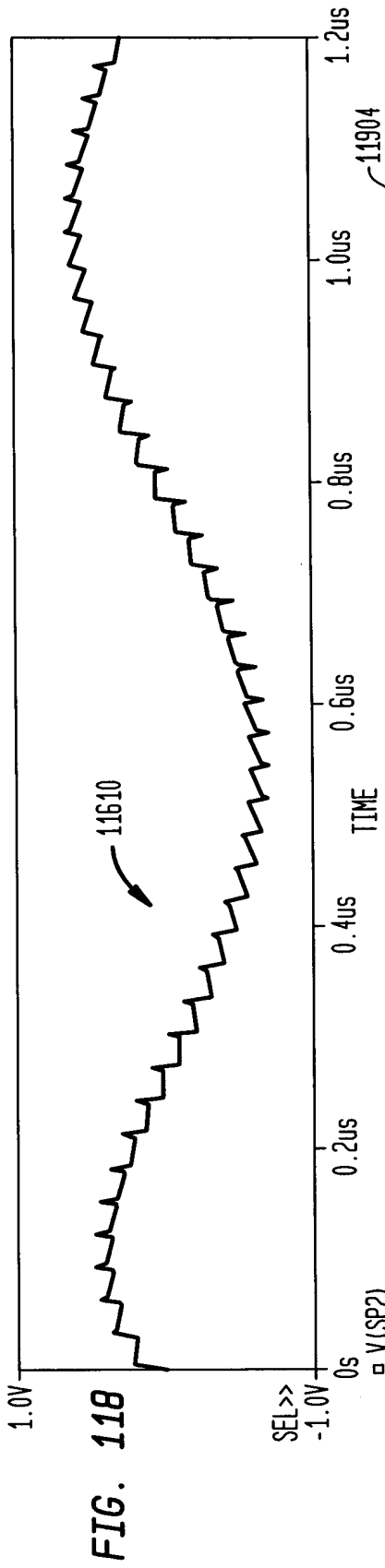
FIG. 115





**FIG. 117**





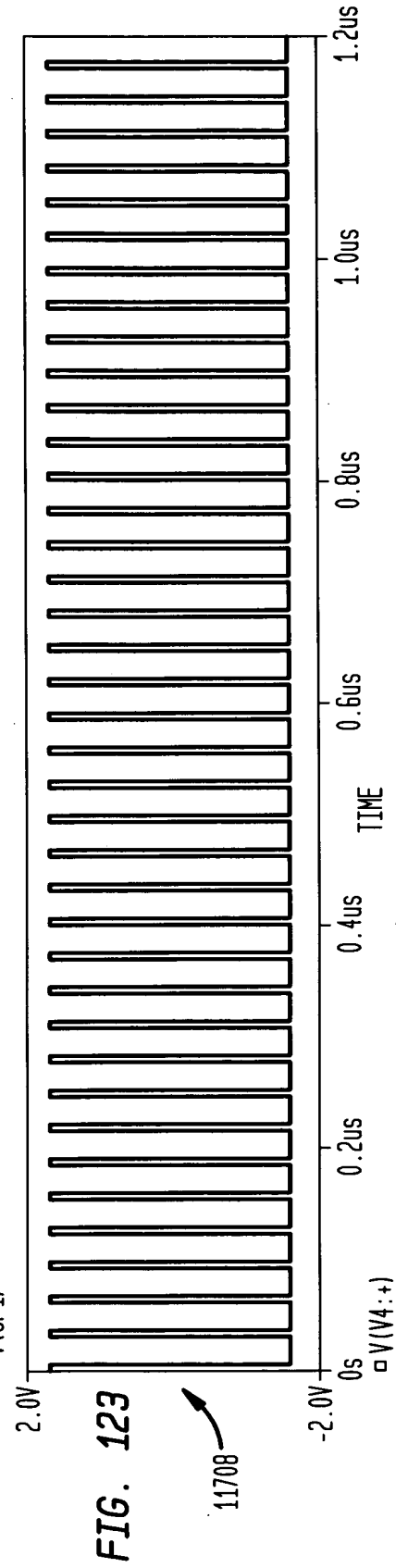
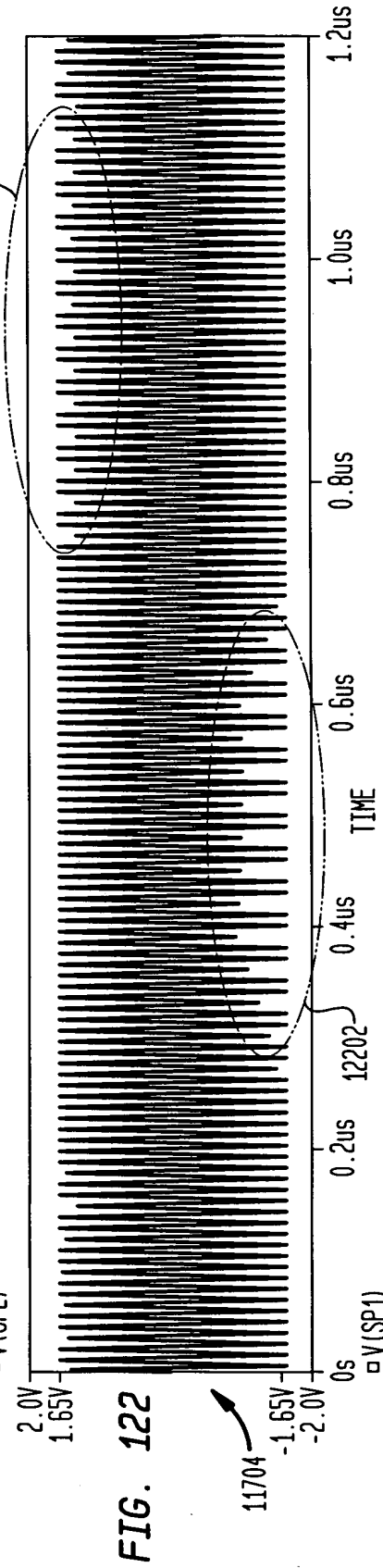
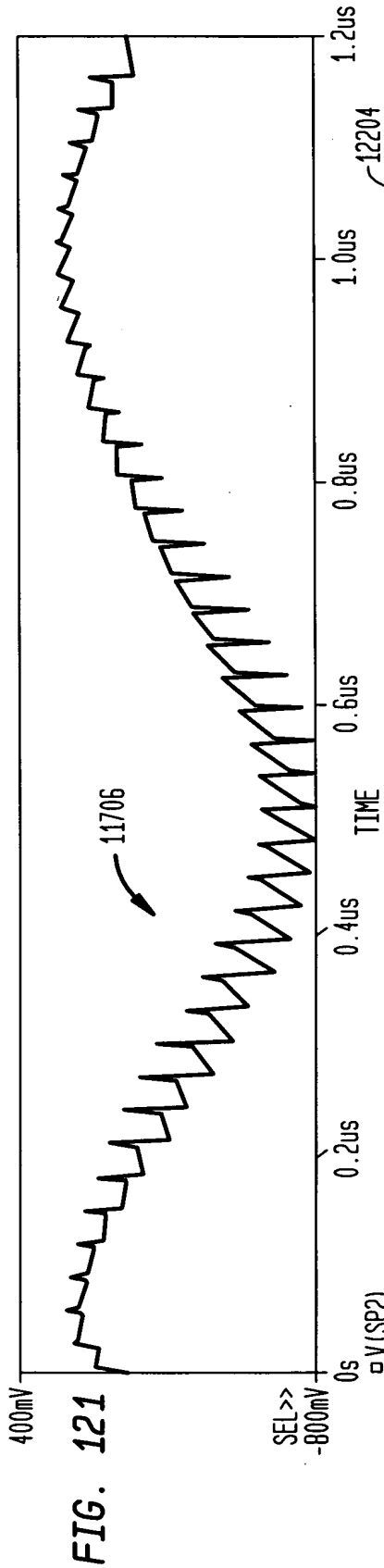
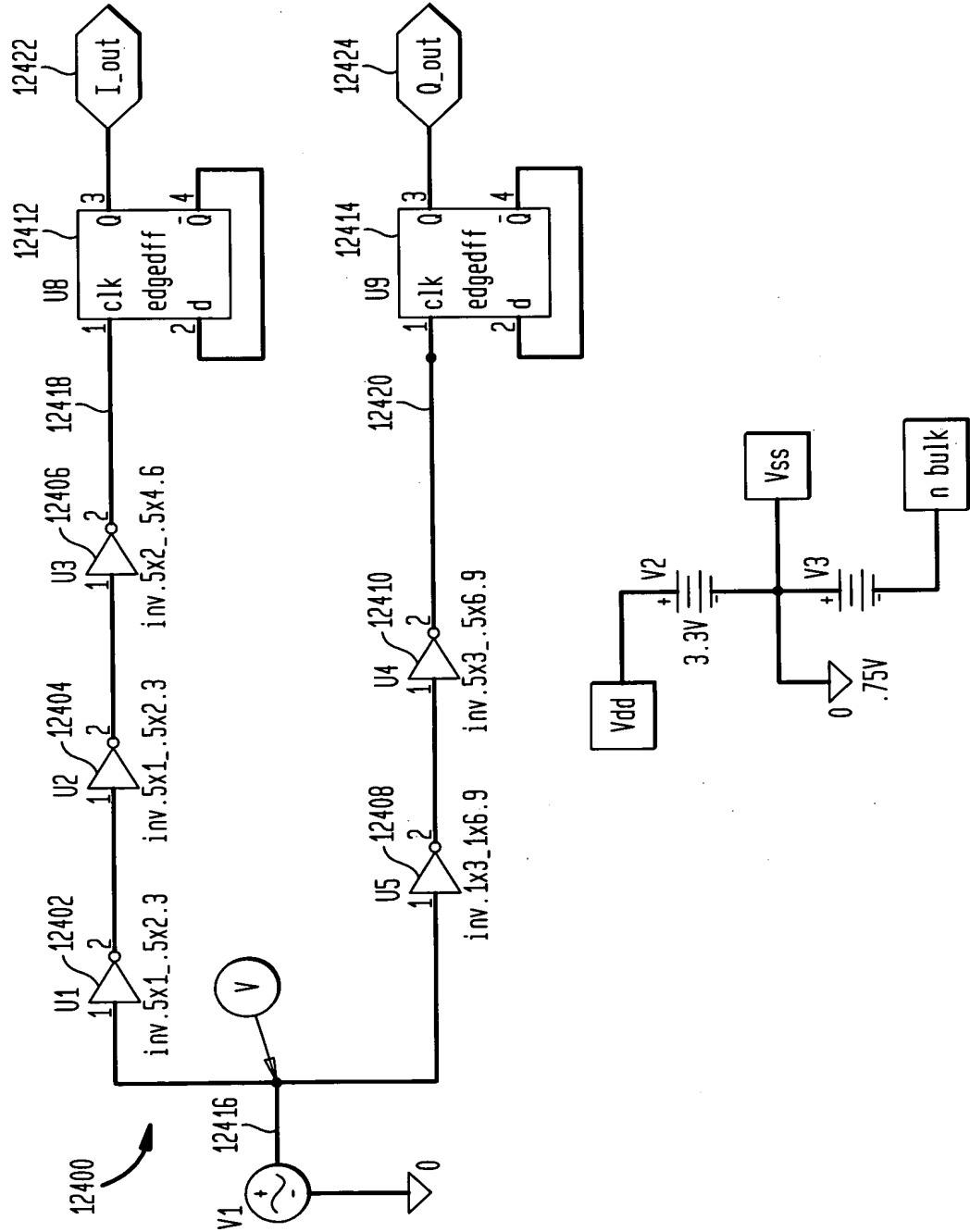
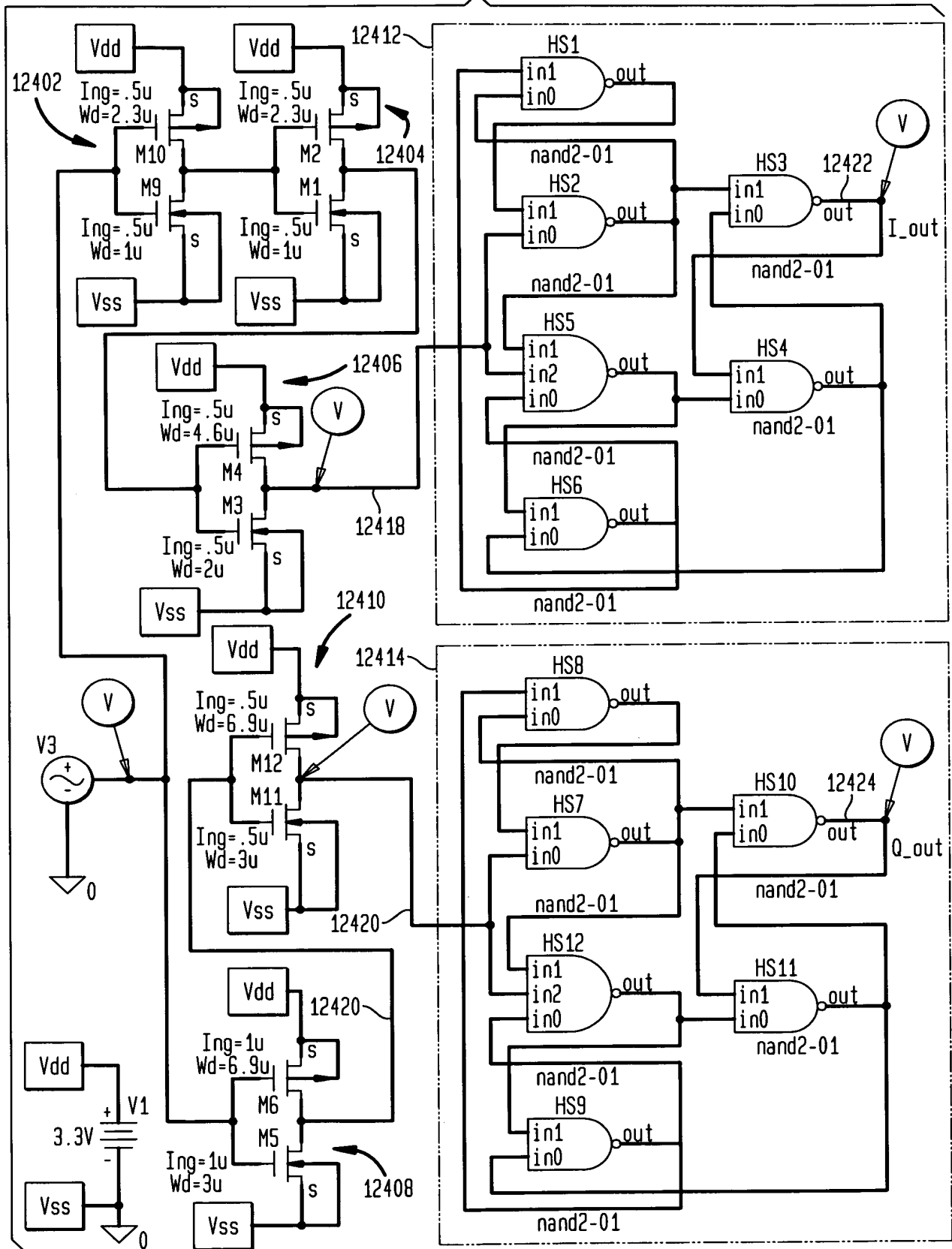
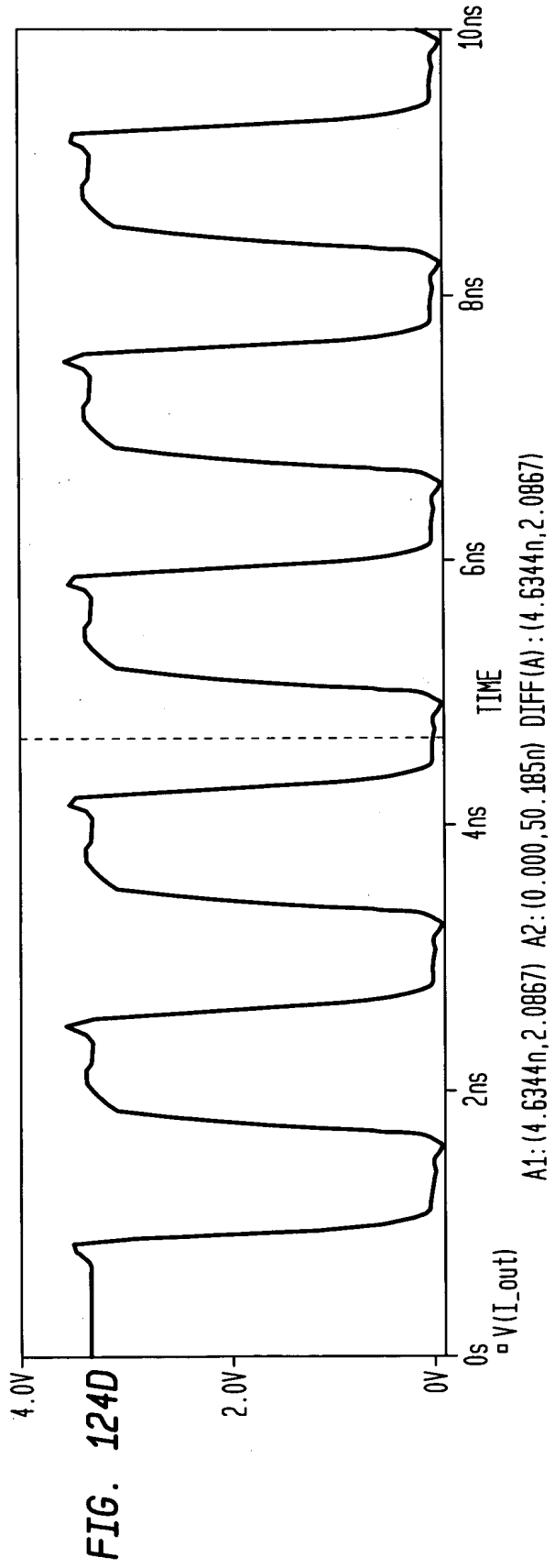
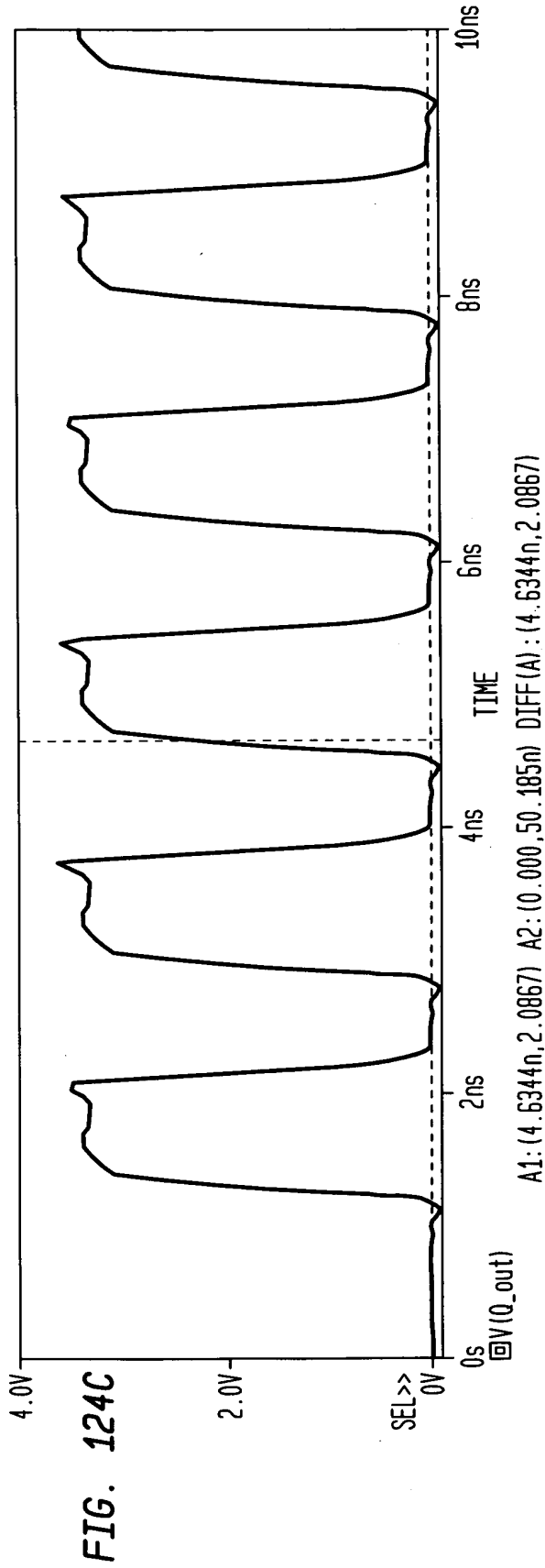


FIG. 124A

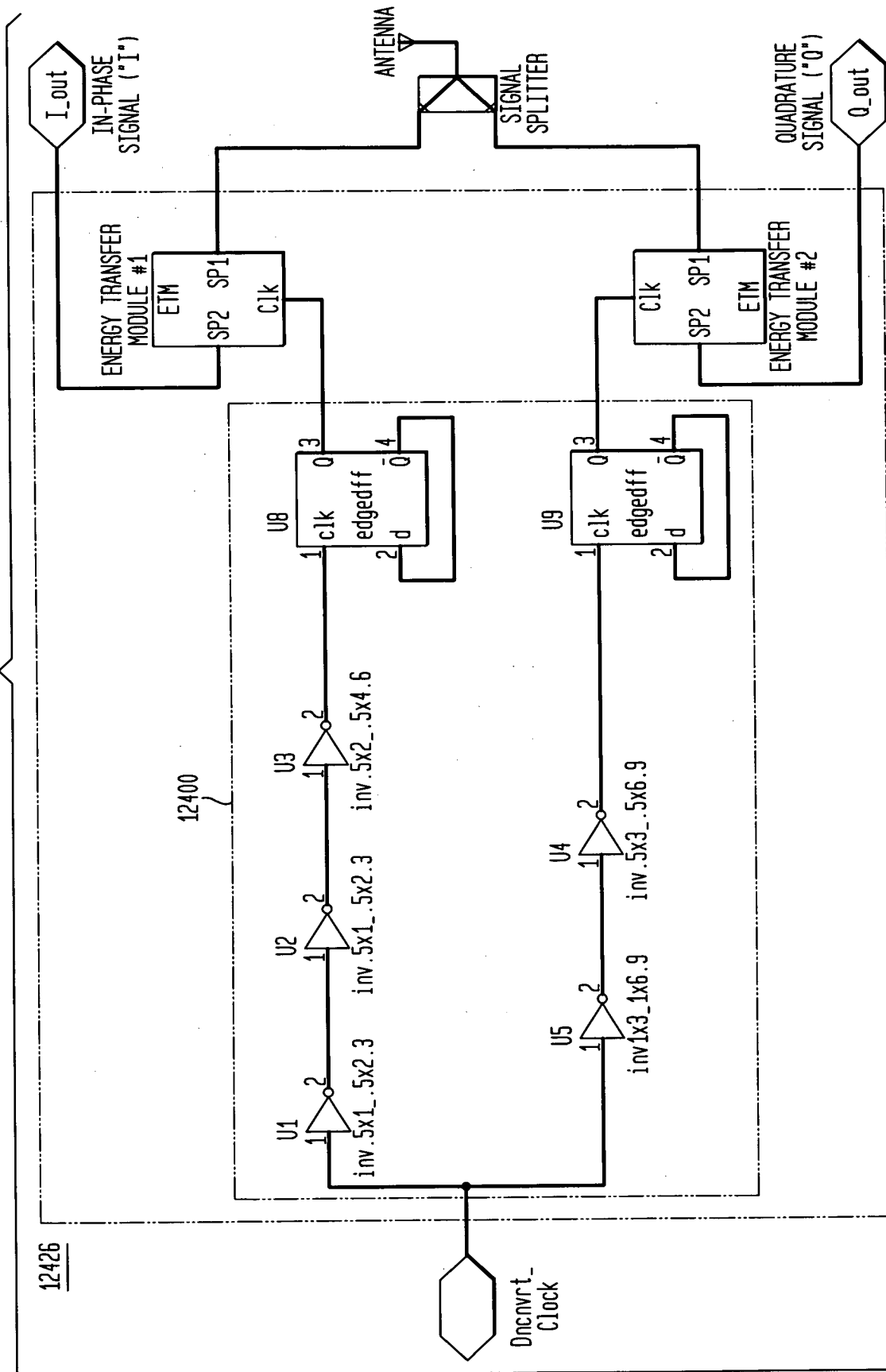


**FIG. 124B**

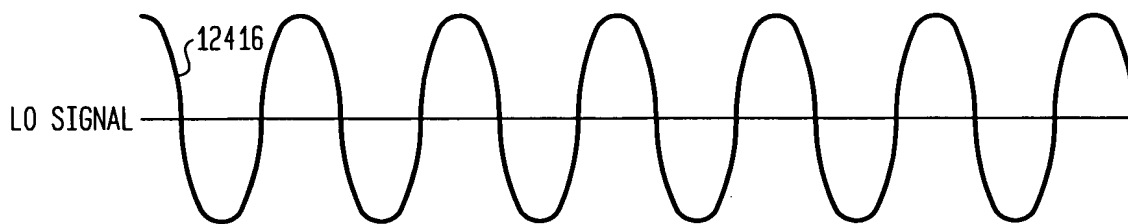




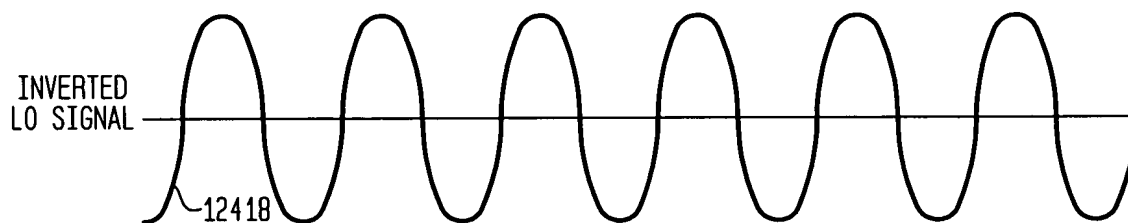
**FIG. 124E**



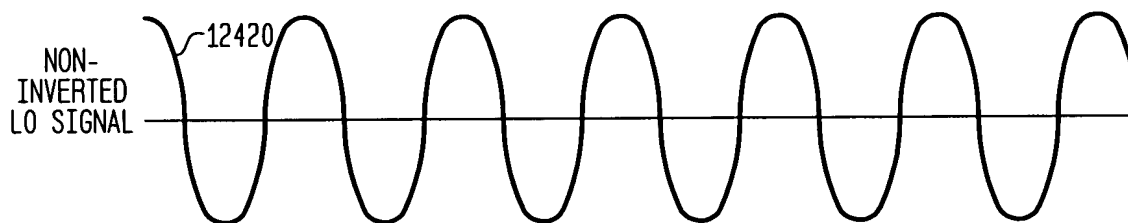
**FIG. 124F**



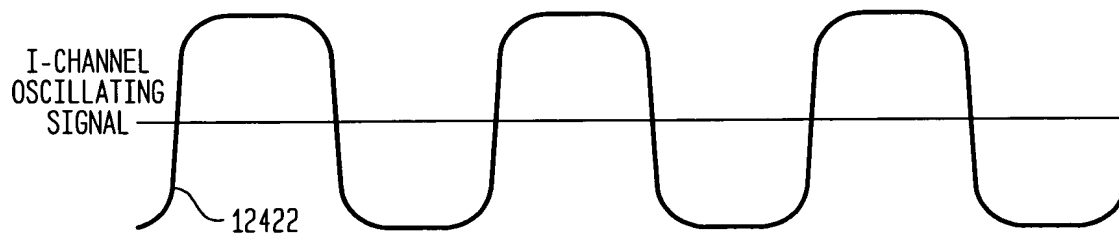
**FIG. 124G**



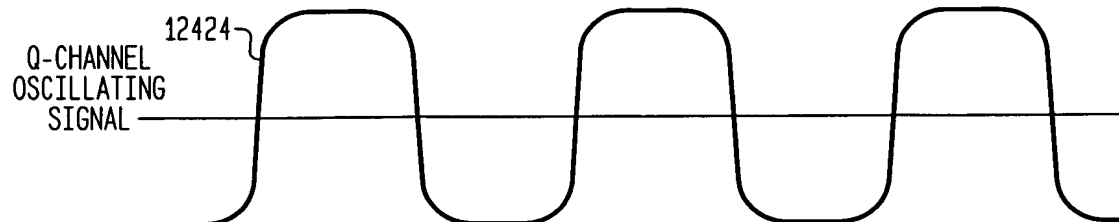
**FIG. 124H**



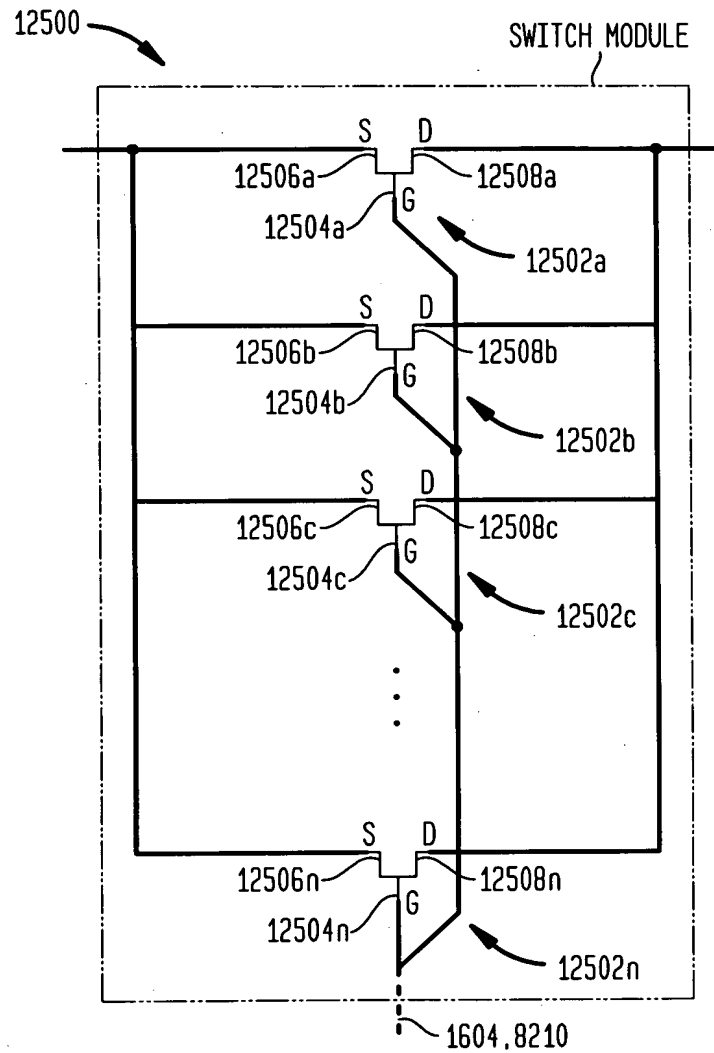
**FIG. 124I**

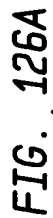


**FIG. 124J**



**FIG. 125**





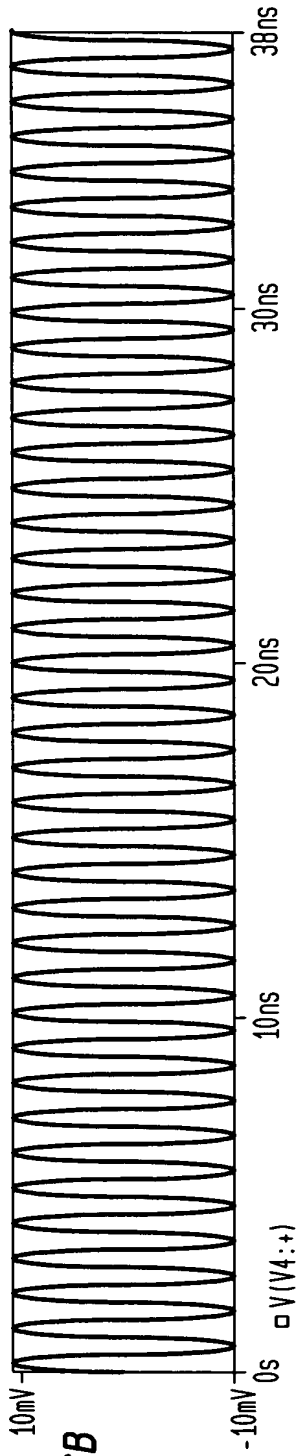


FIG. 126B

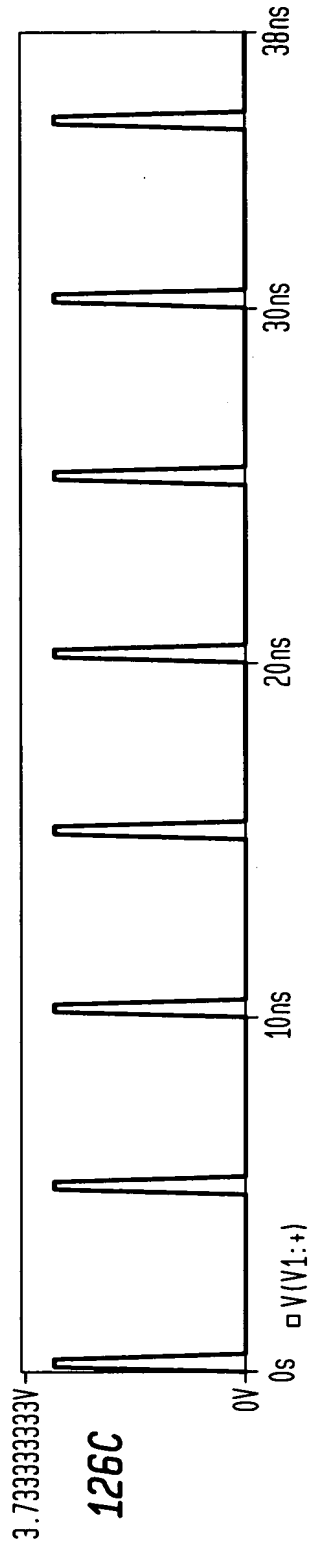


FIG. 126C

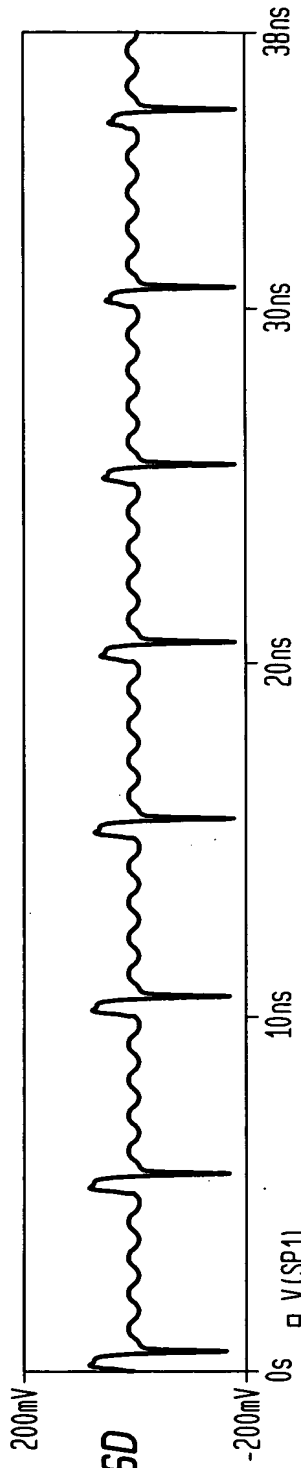


FIG. 126D

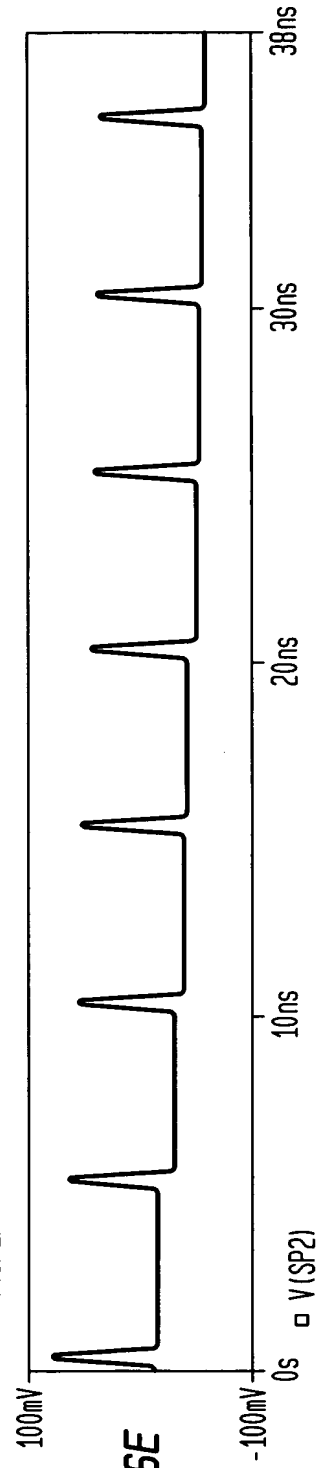
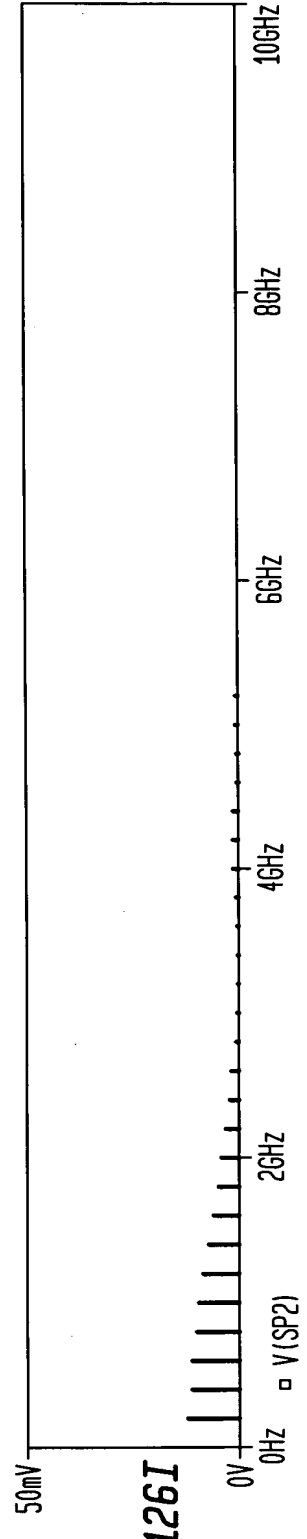
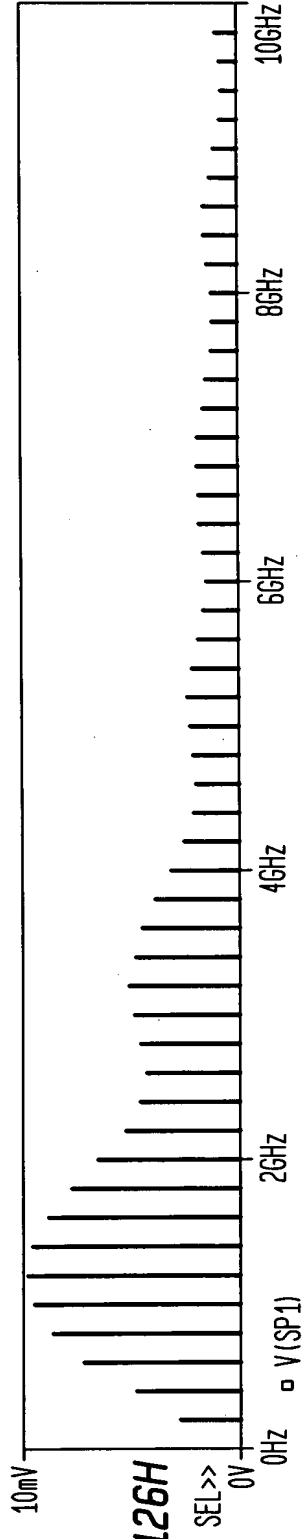
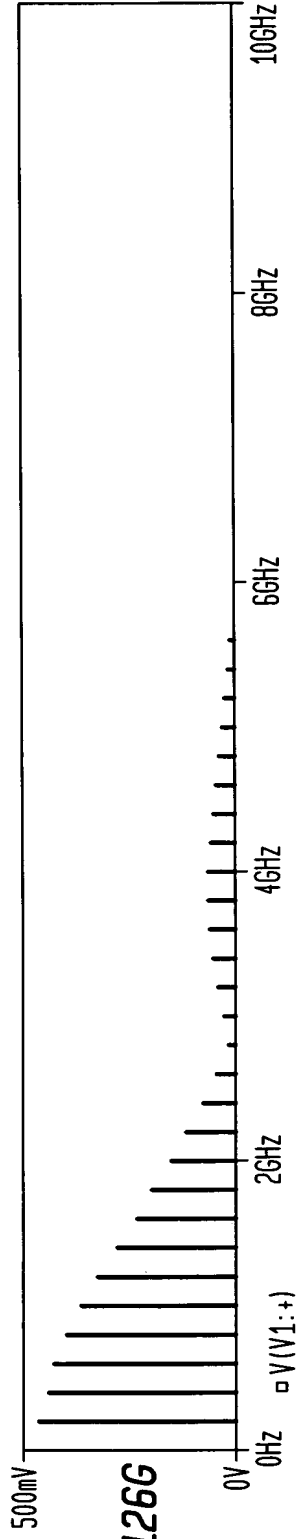
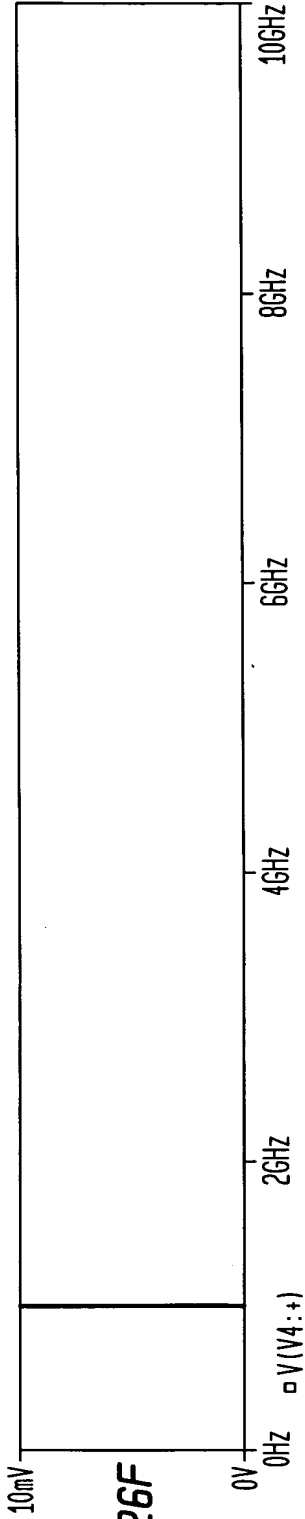
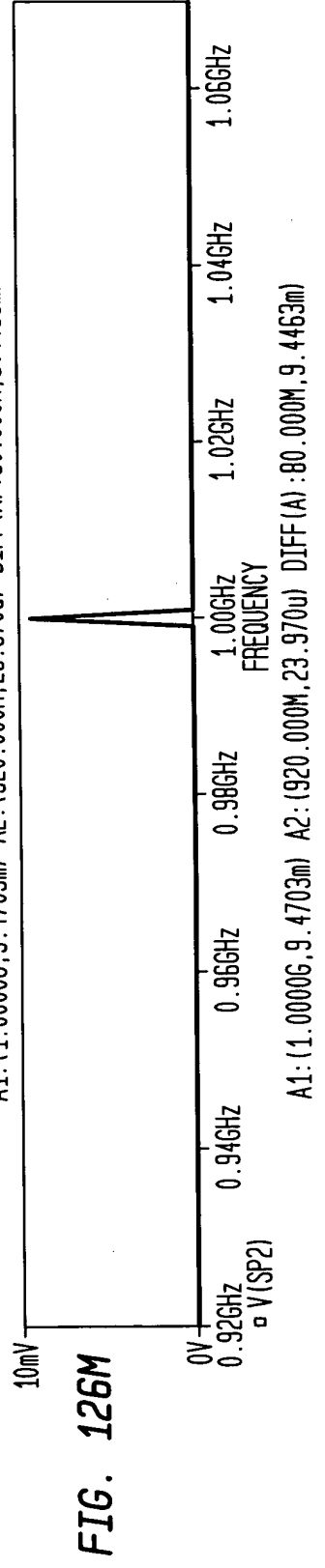
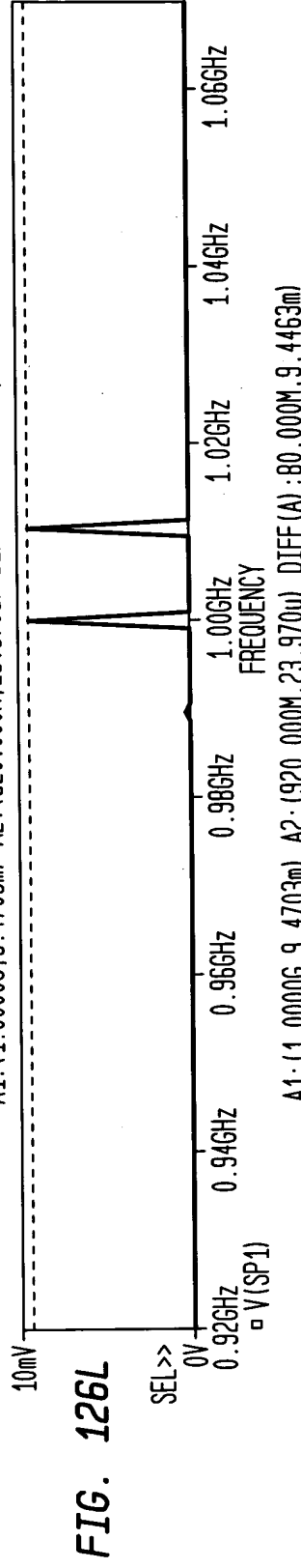
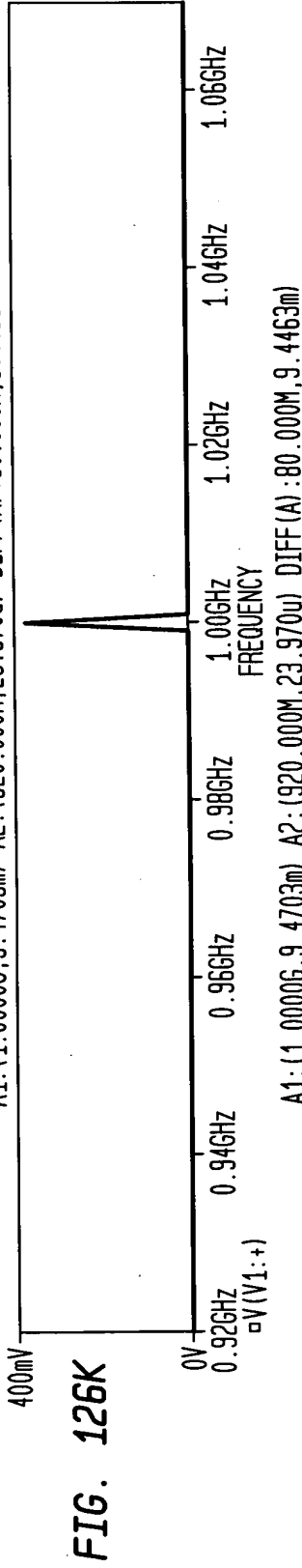
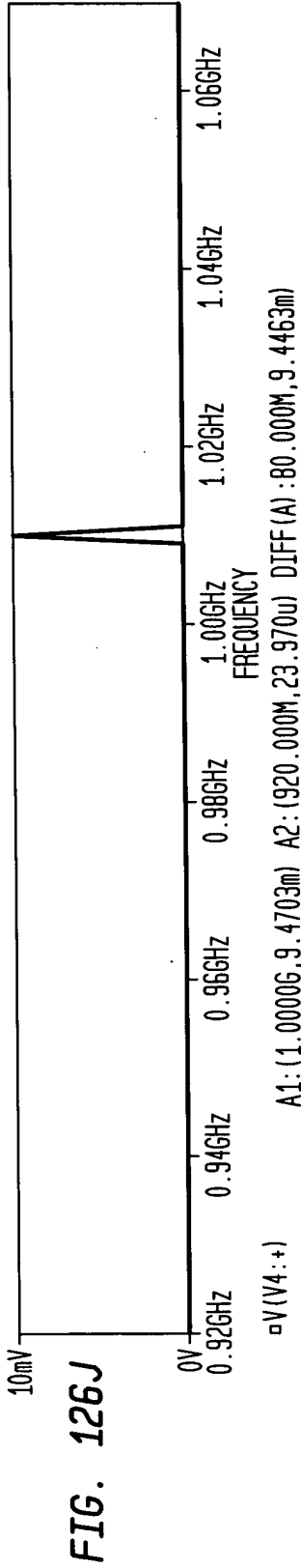


FIG. 126E





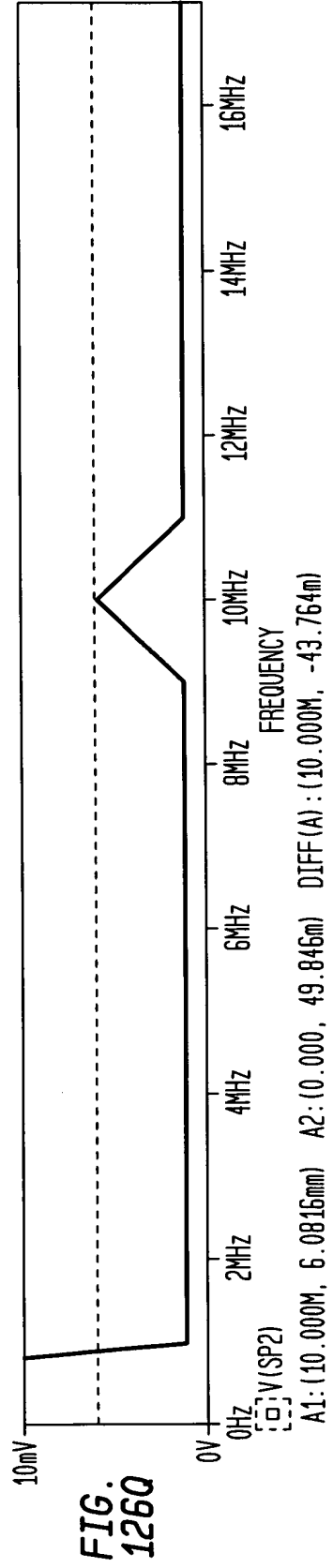
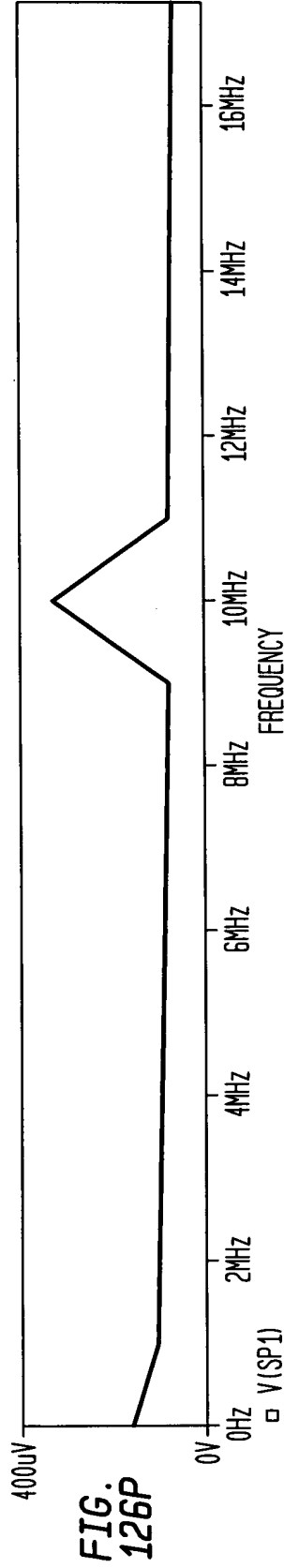
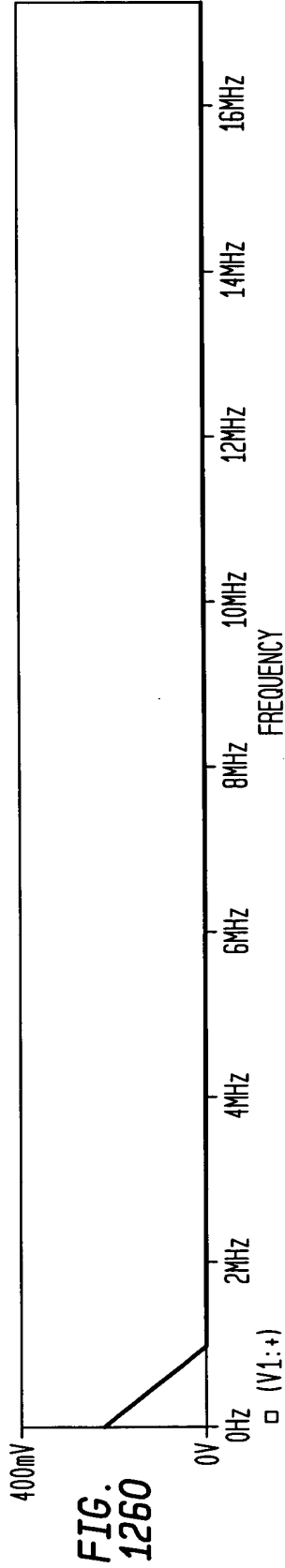
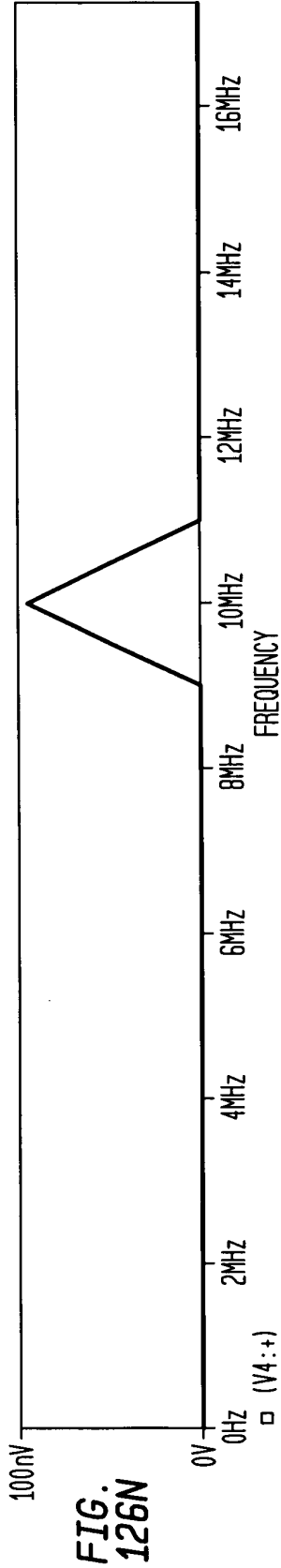
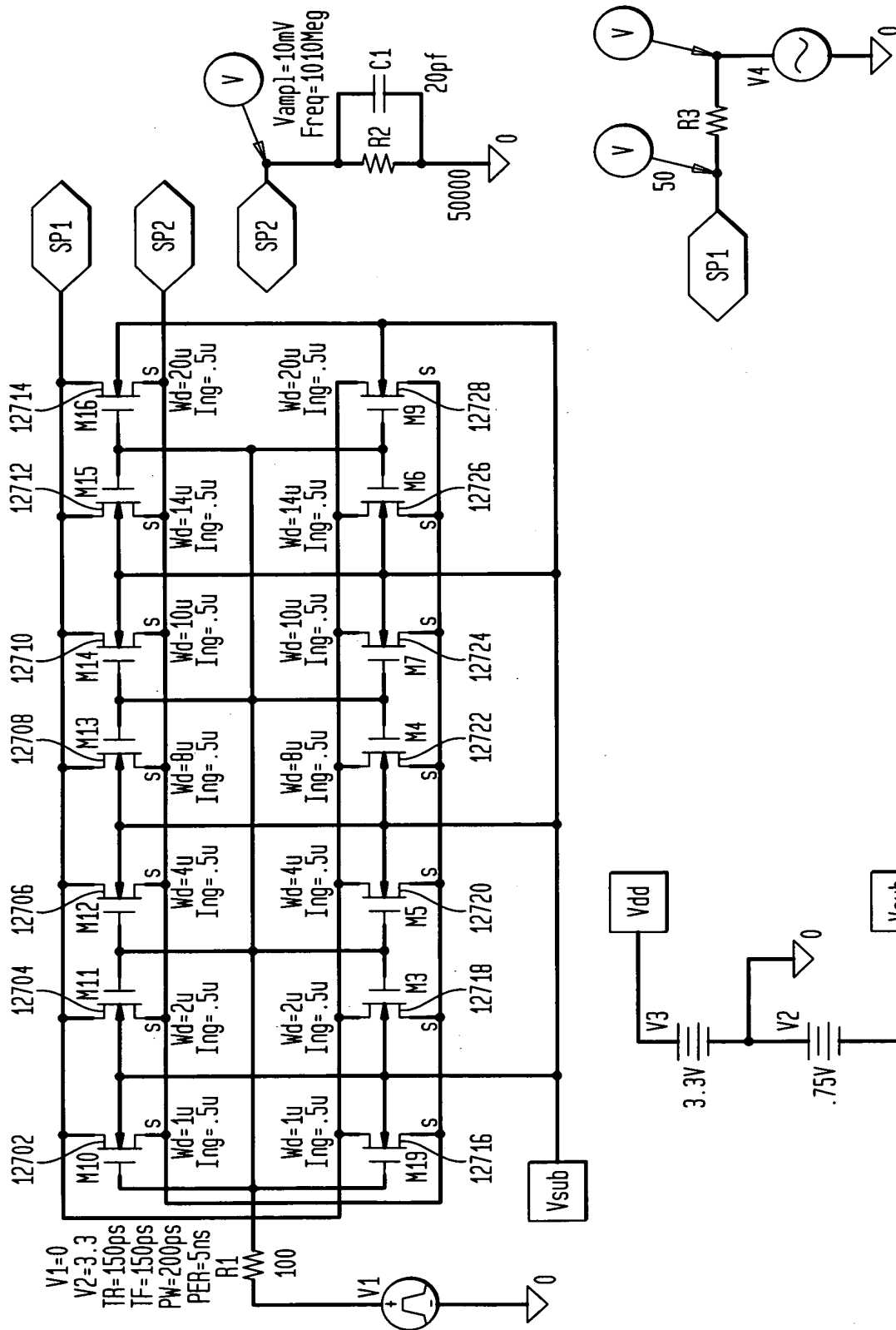


FIG. 127A



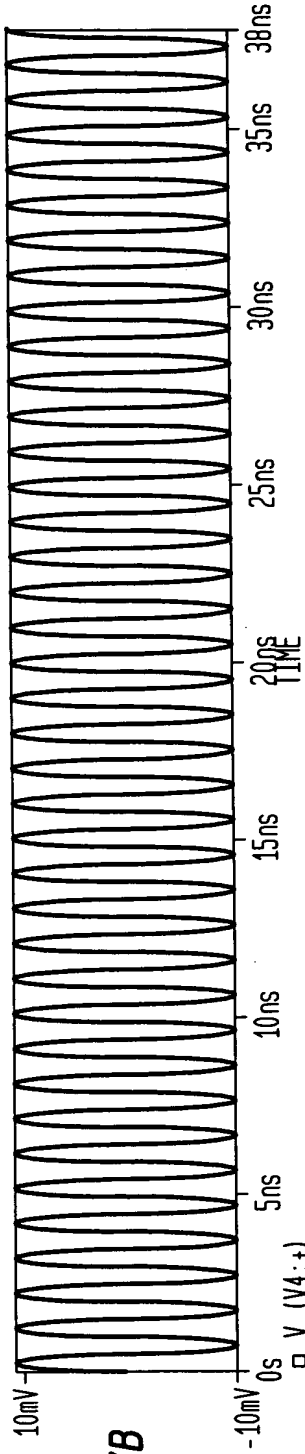


FIG. 127B

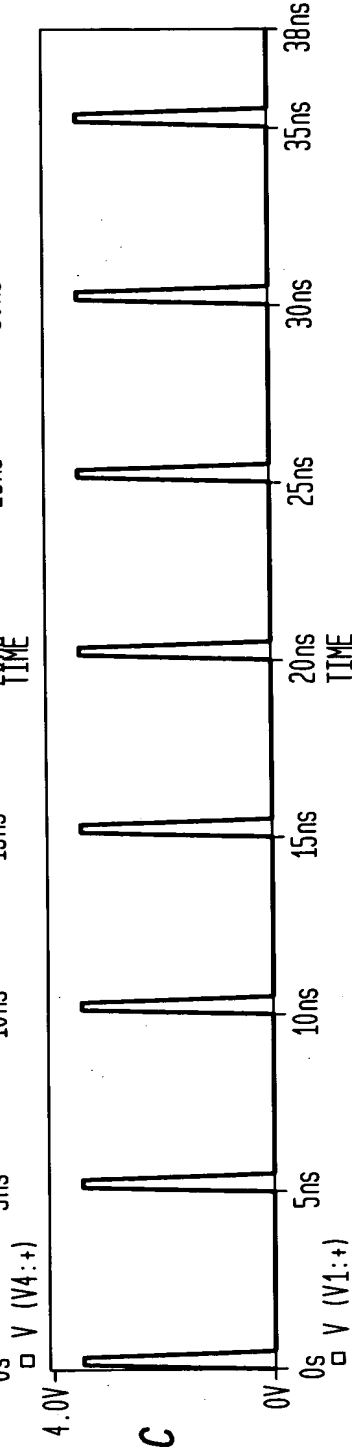


FIG. 127C

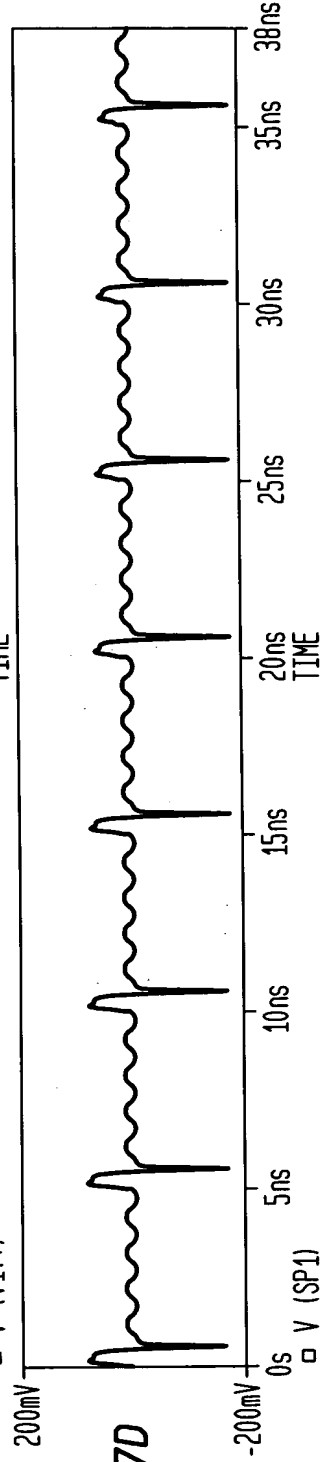


FIG. 127D

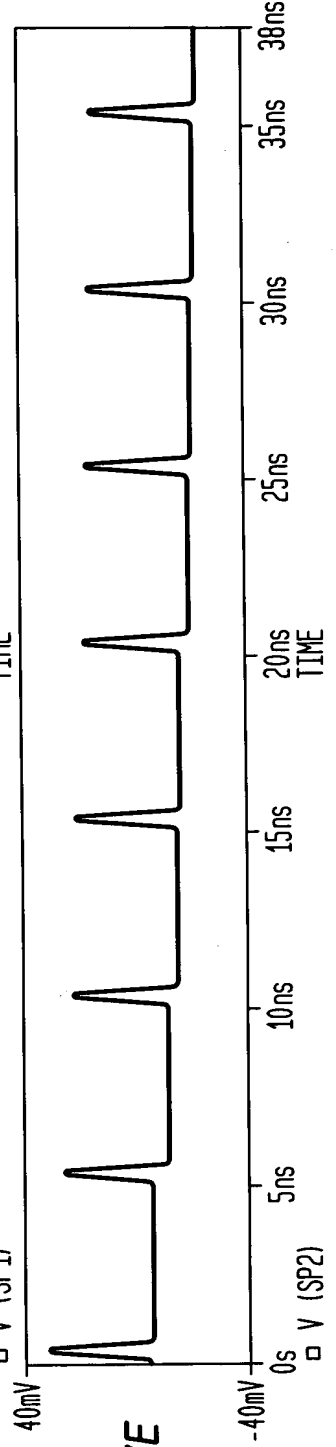
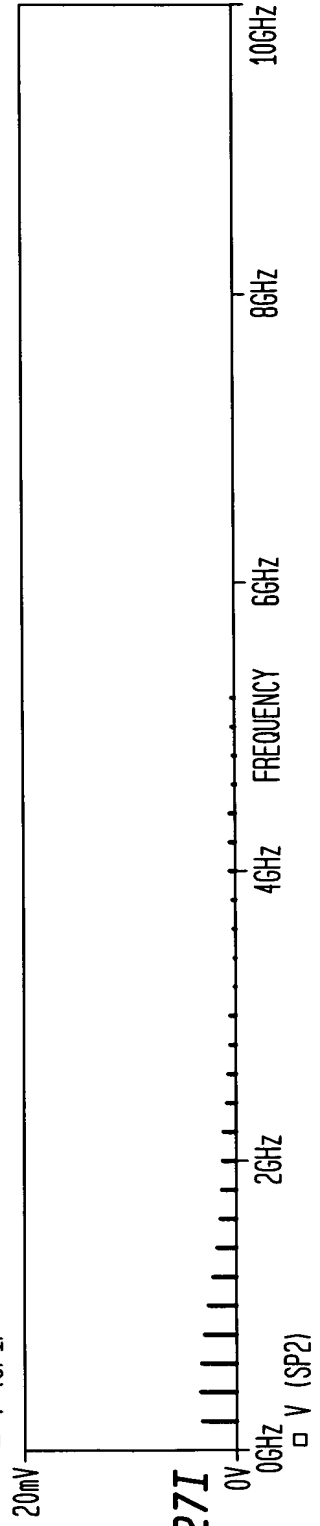
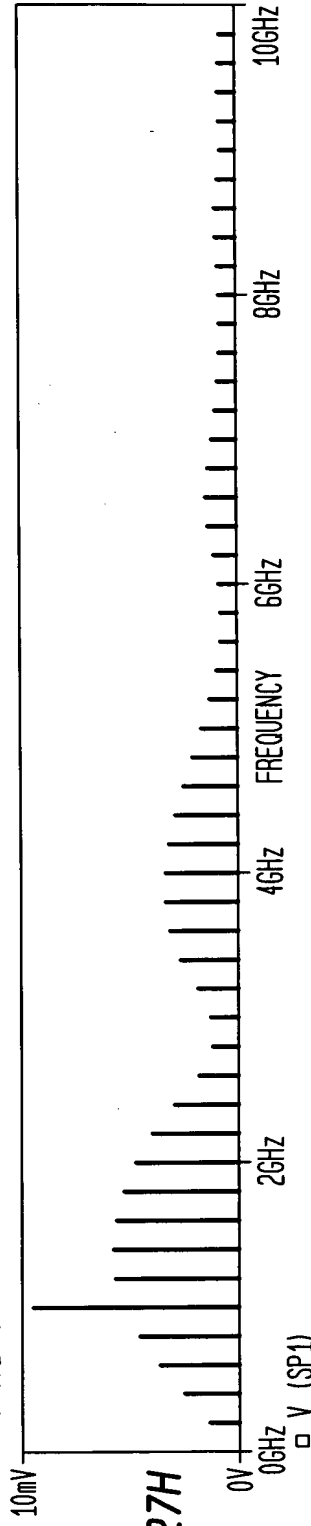
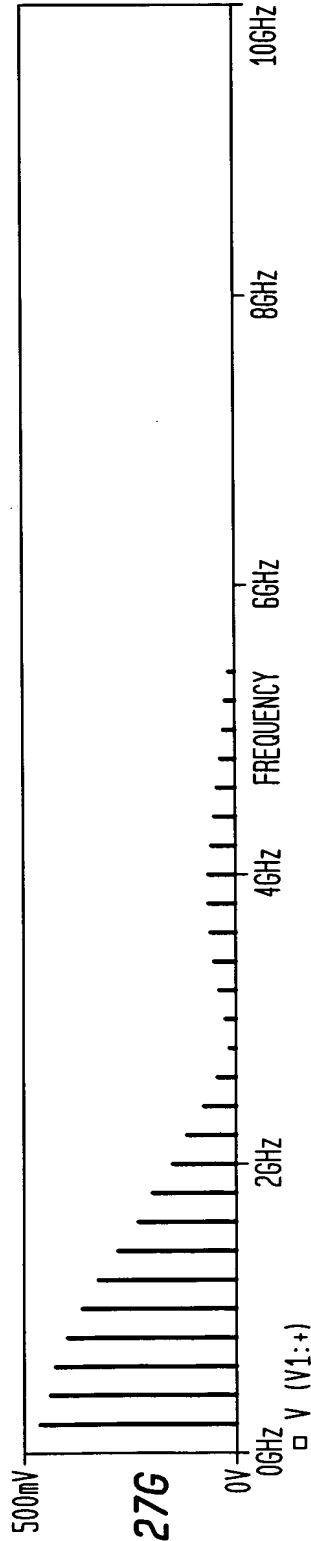
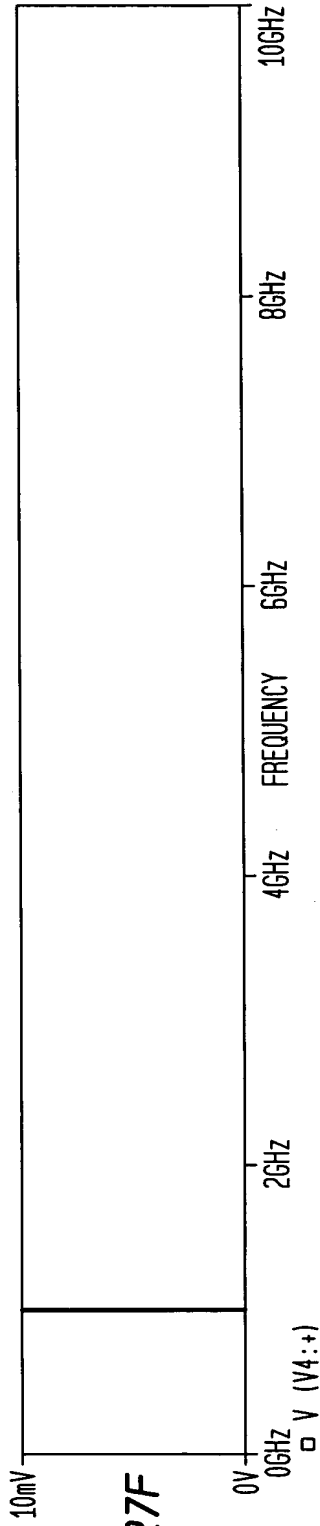
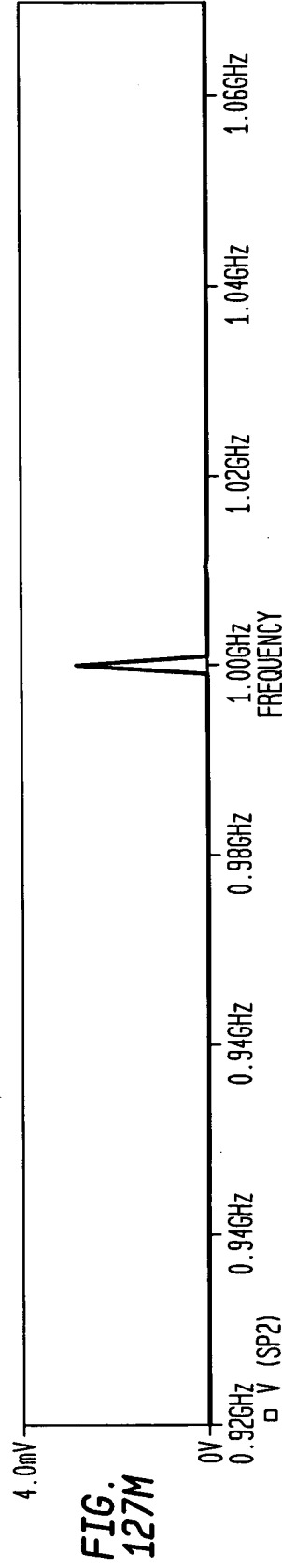
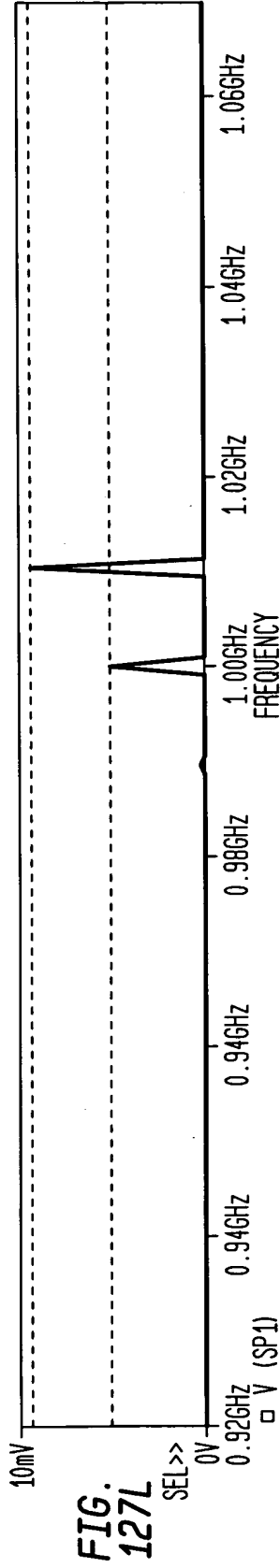
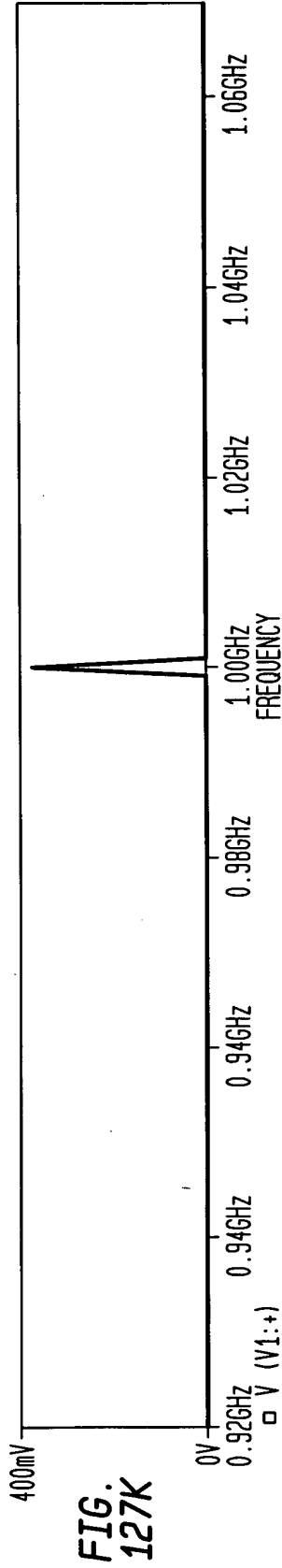
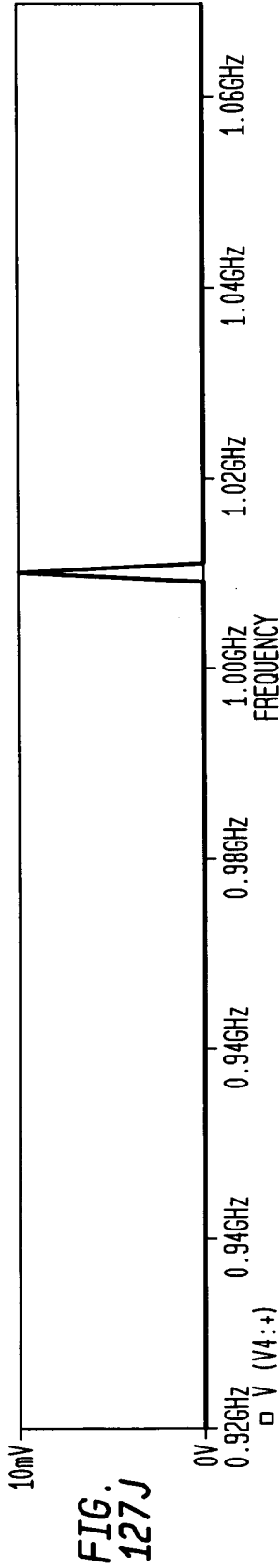
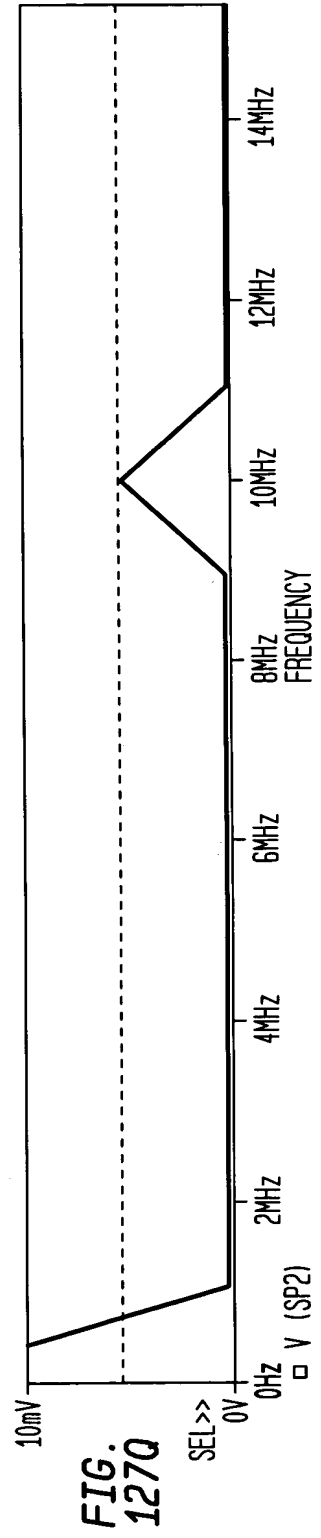
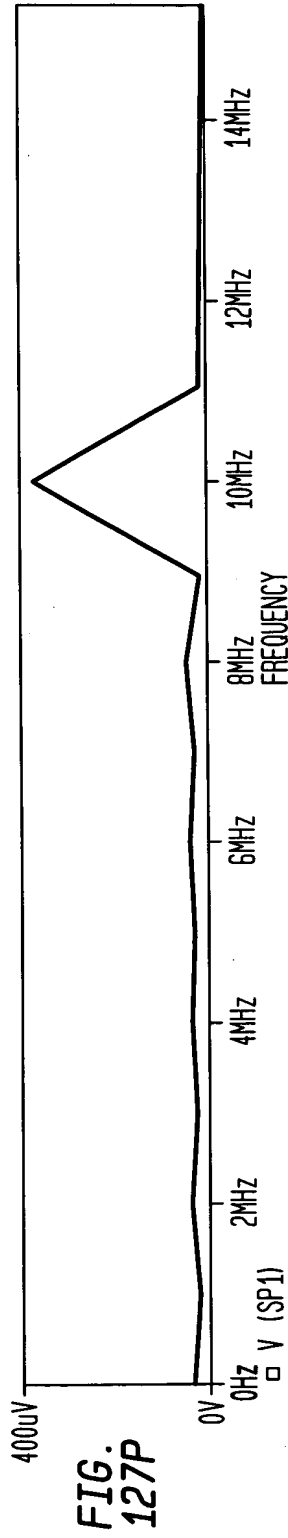
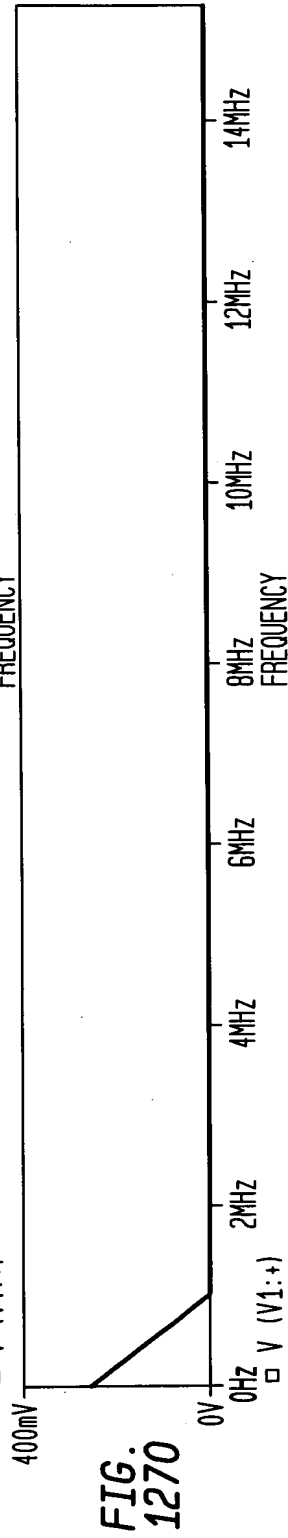
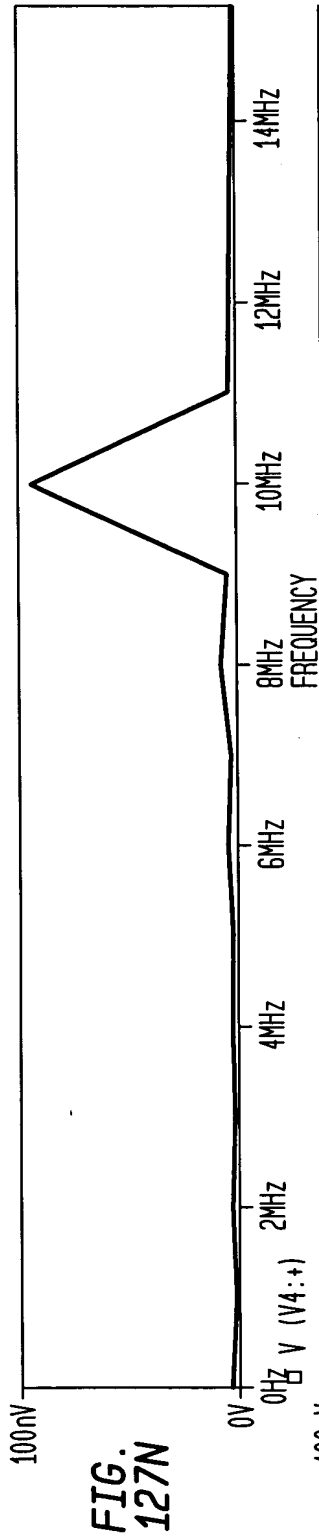


FIG. 127E

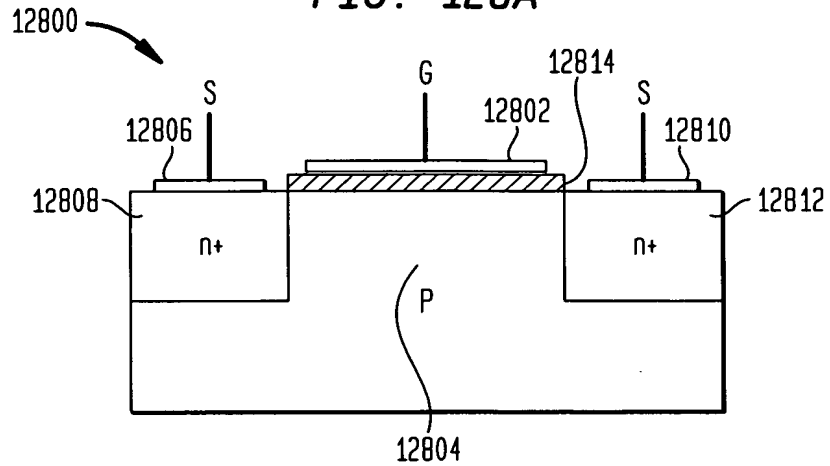




A1:(1.0000G, 5.3091m) A2:(1818.000M, 11.646u) DIFF(A):(182.000M, 5.2974m)



**FIG. 128A**



**FIG. 128B**

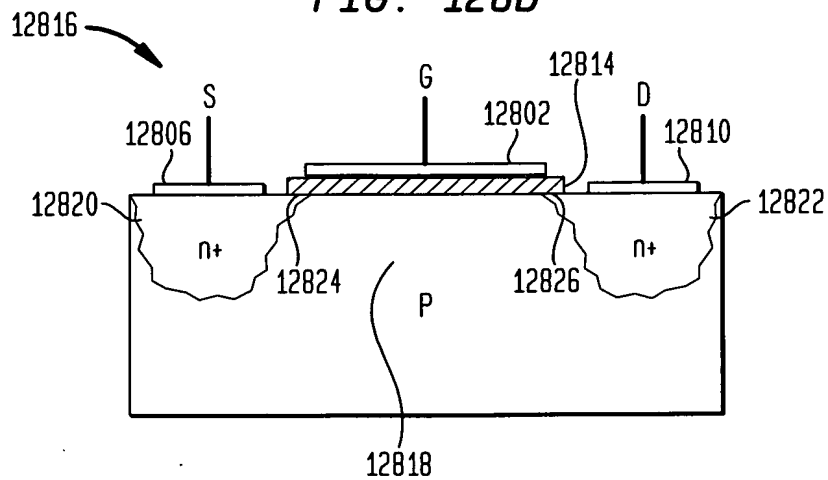


FIG. 128C

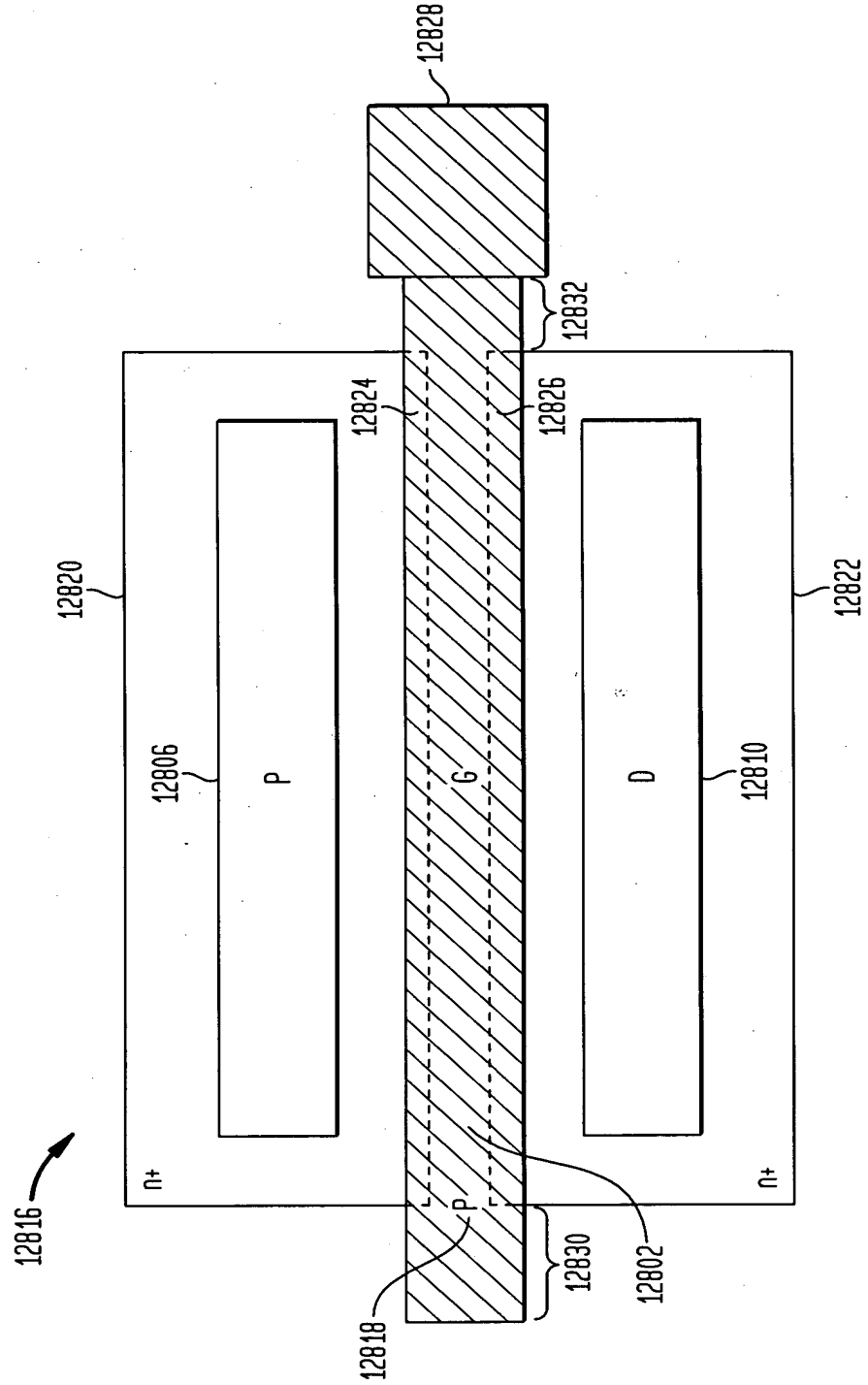
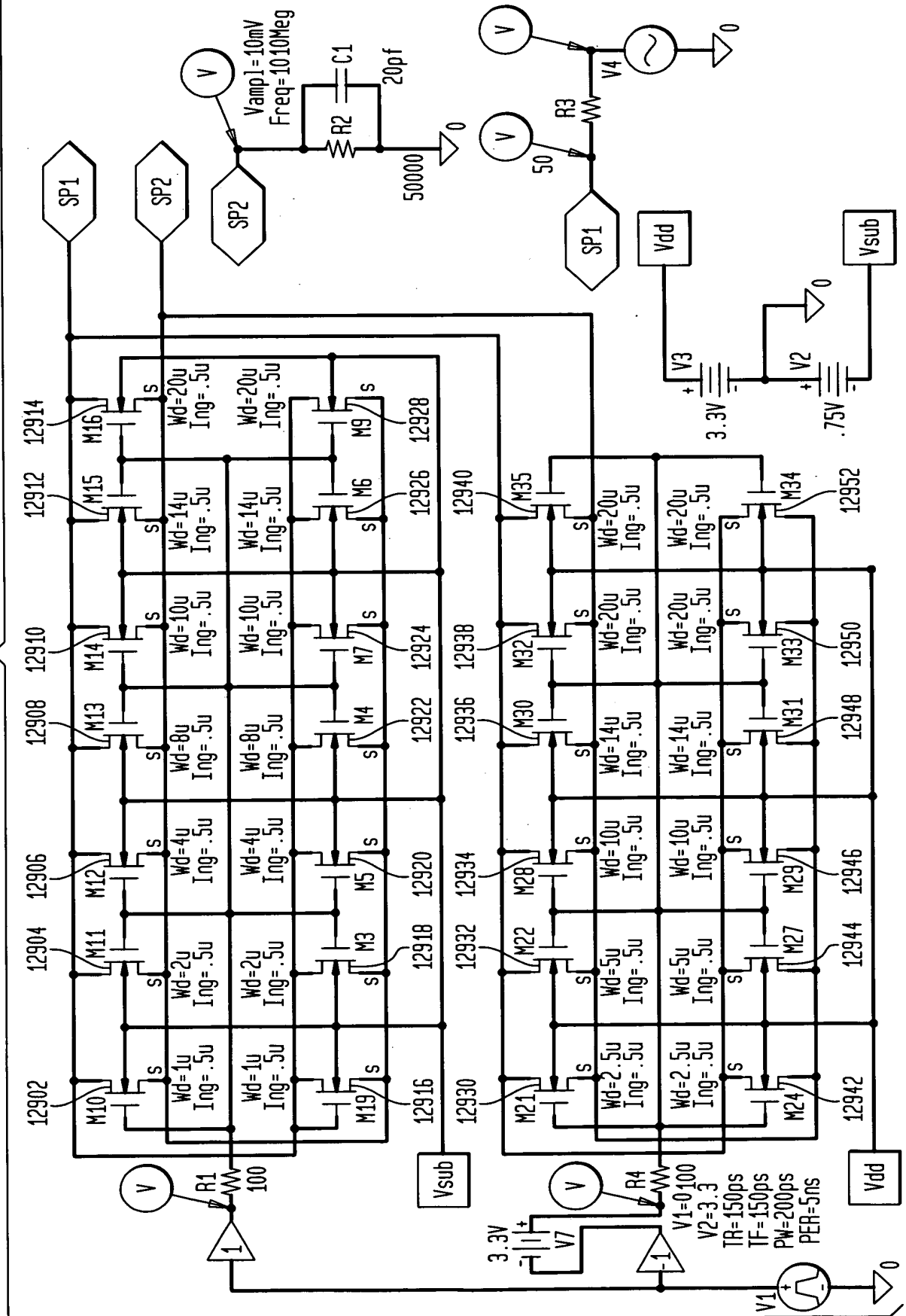
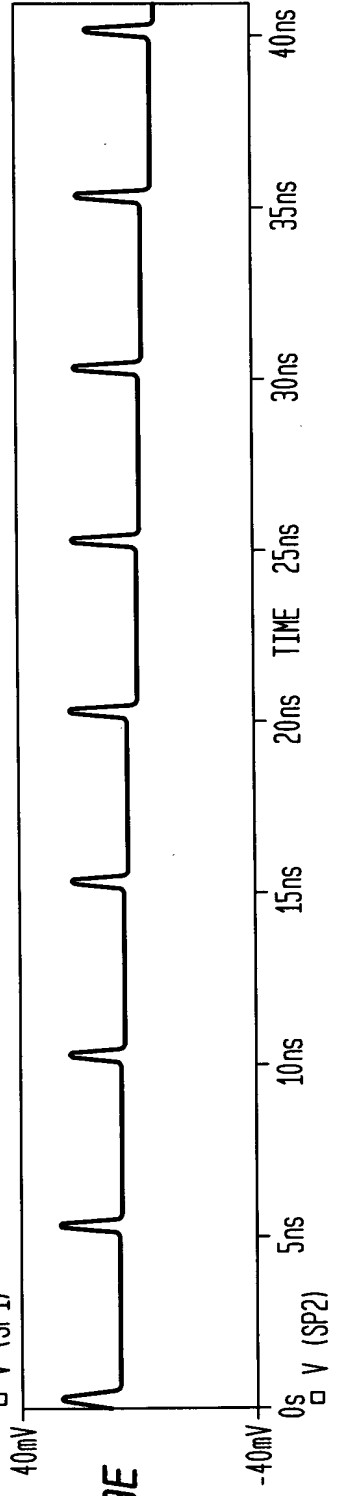
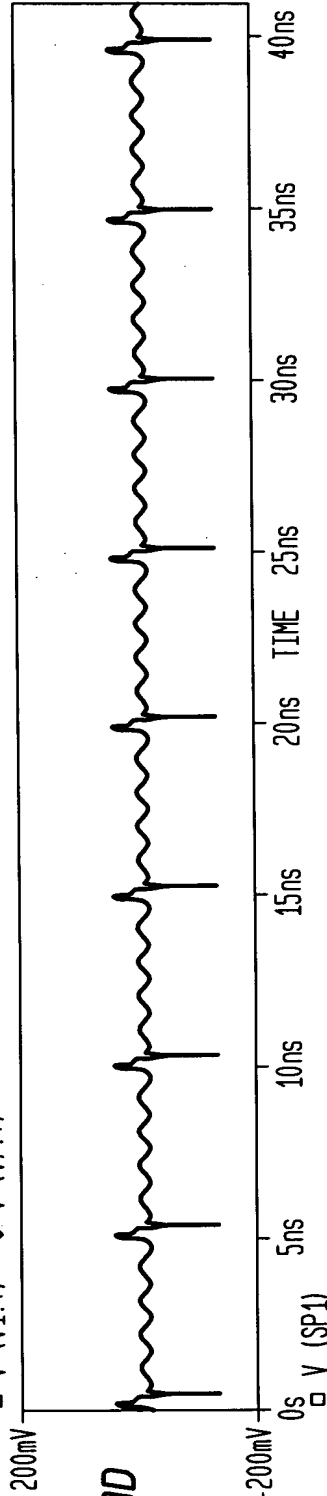
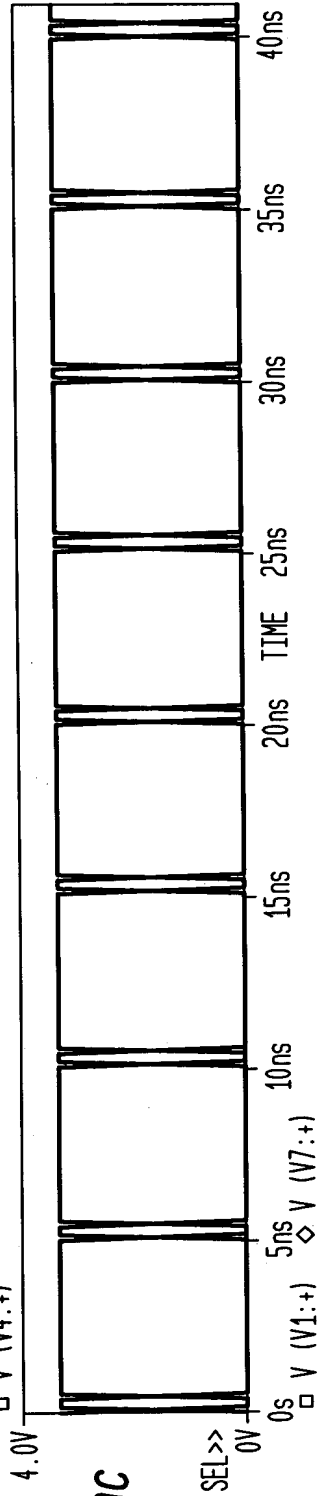
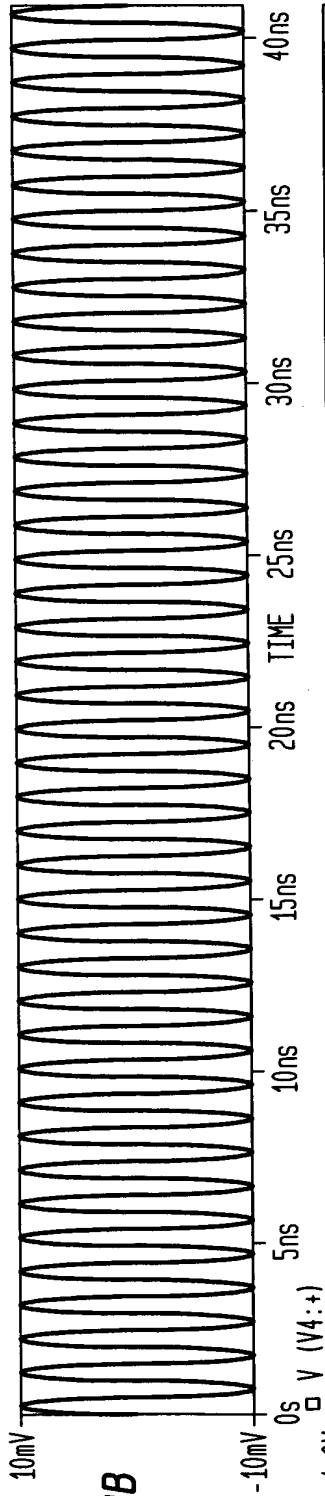
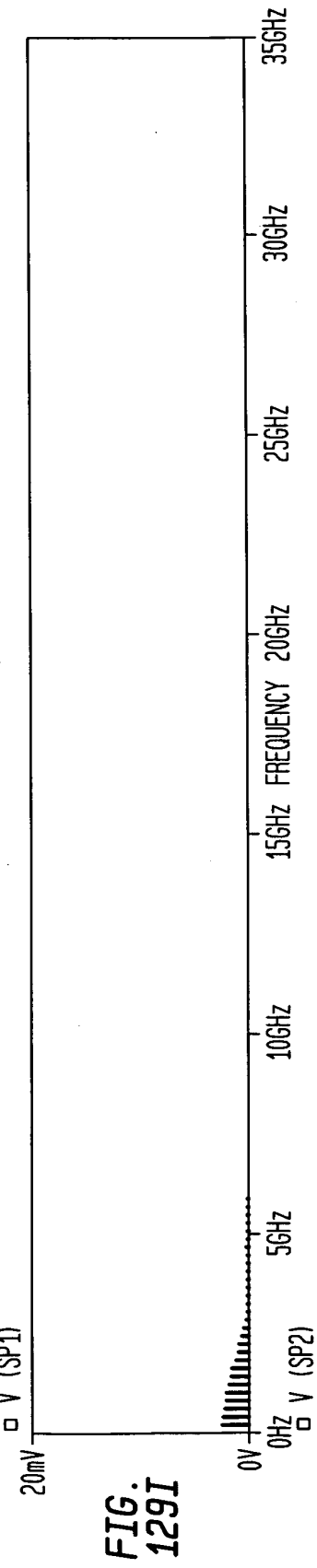
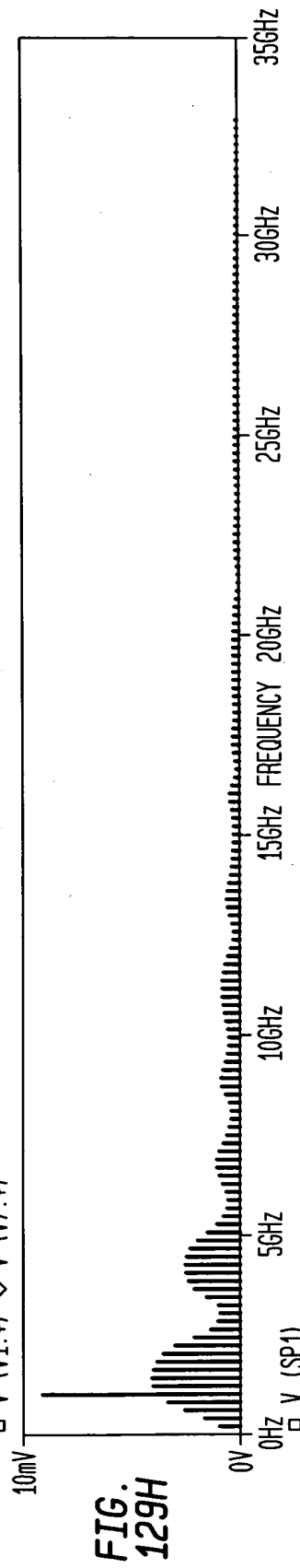
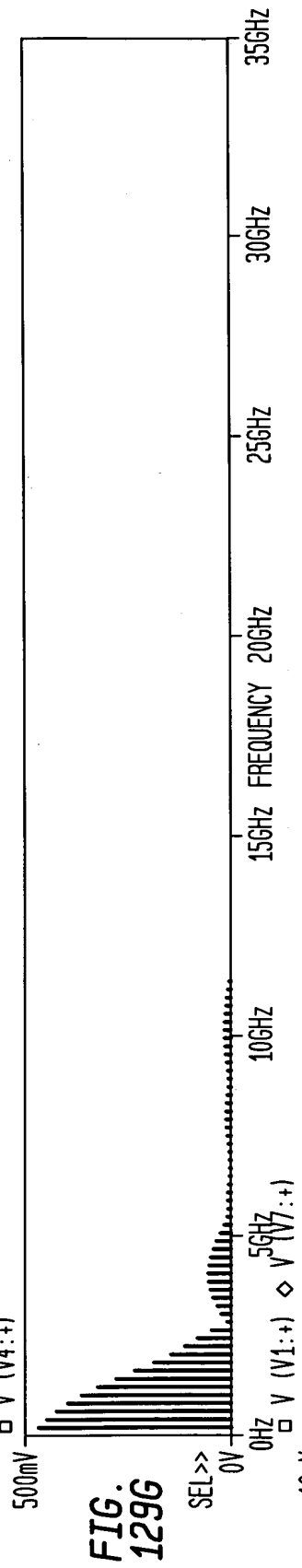
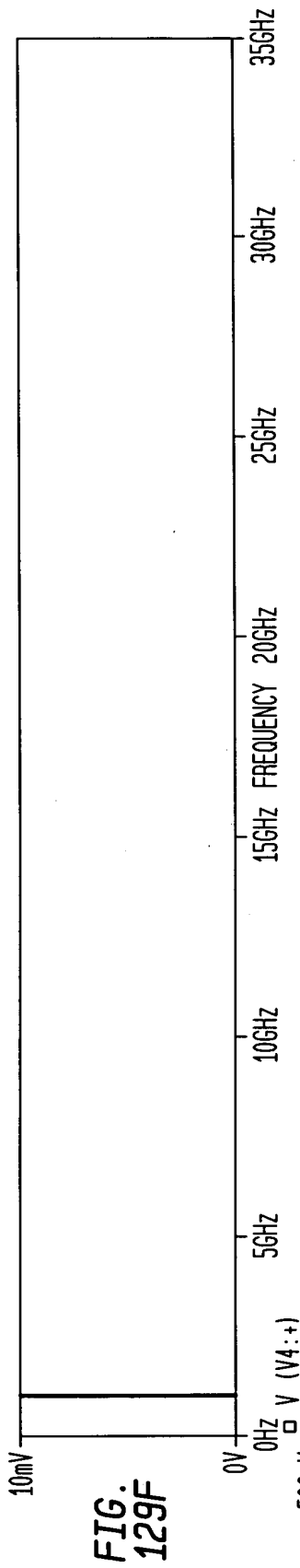
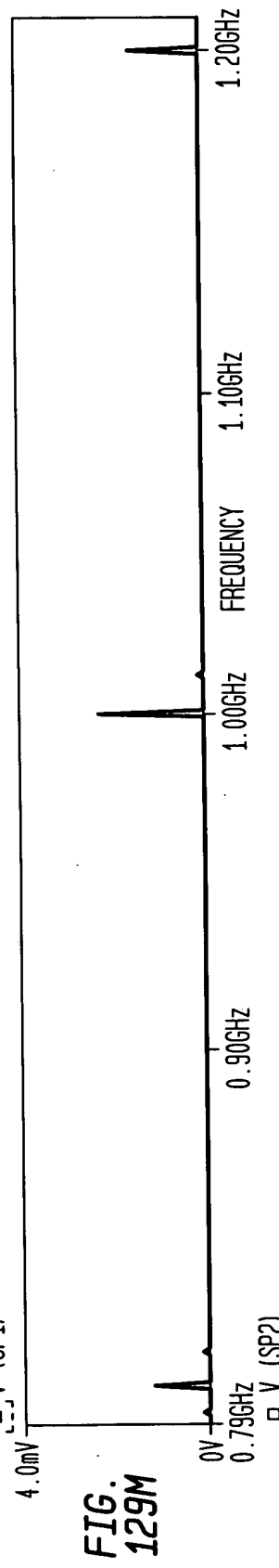
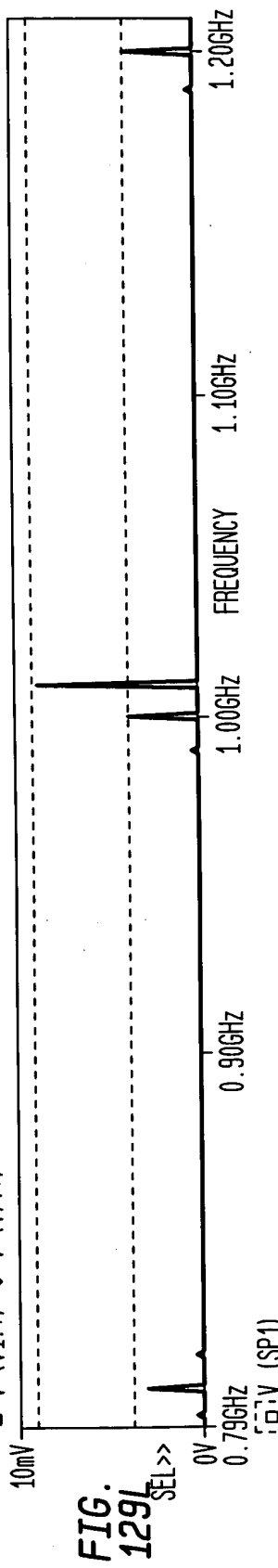
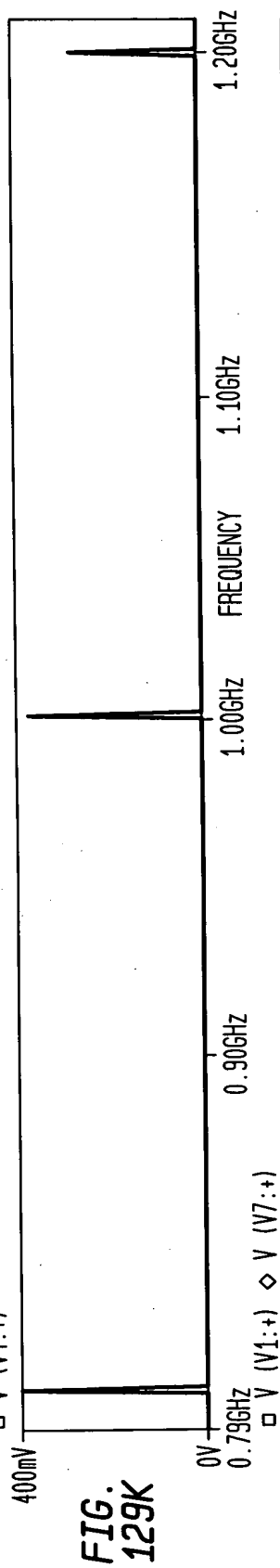
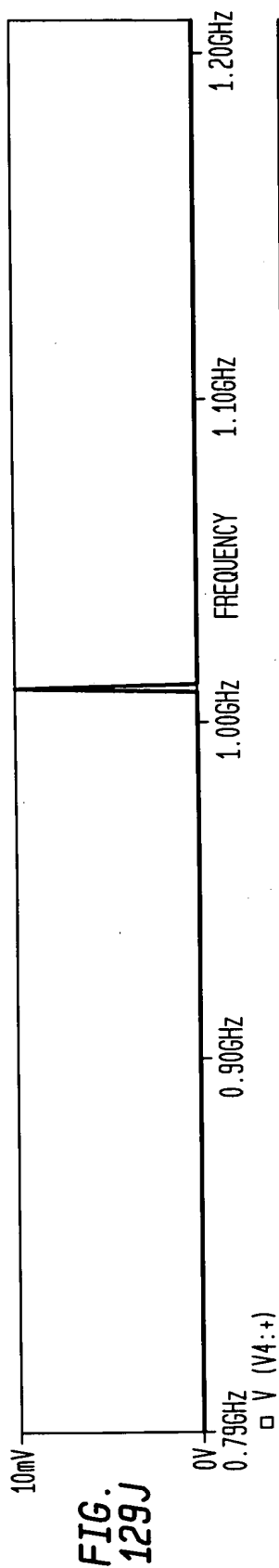


FIG. 129A

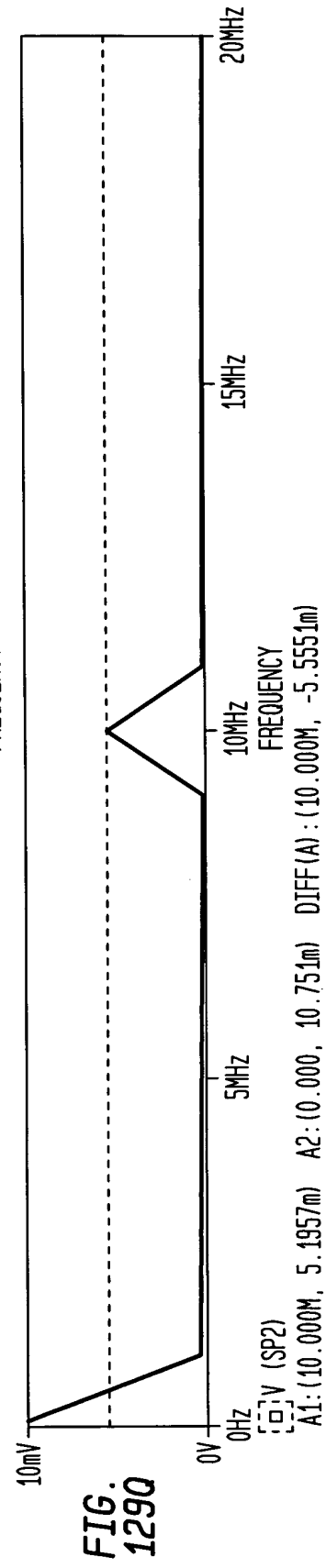
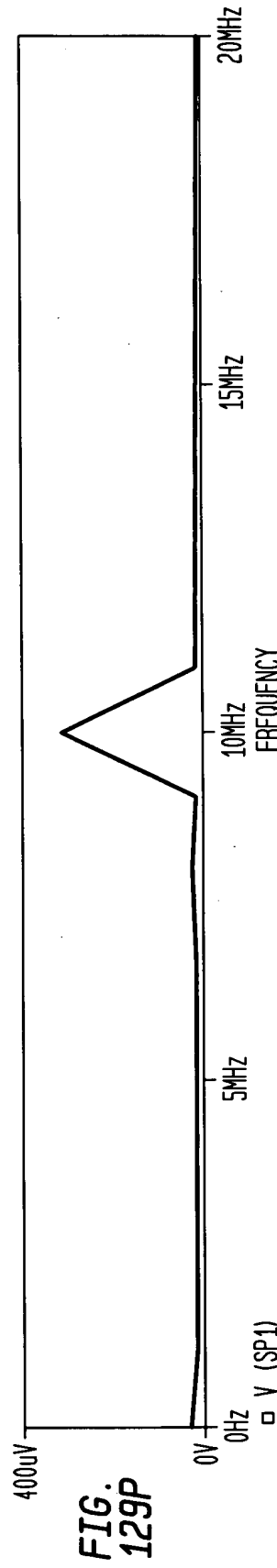
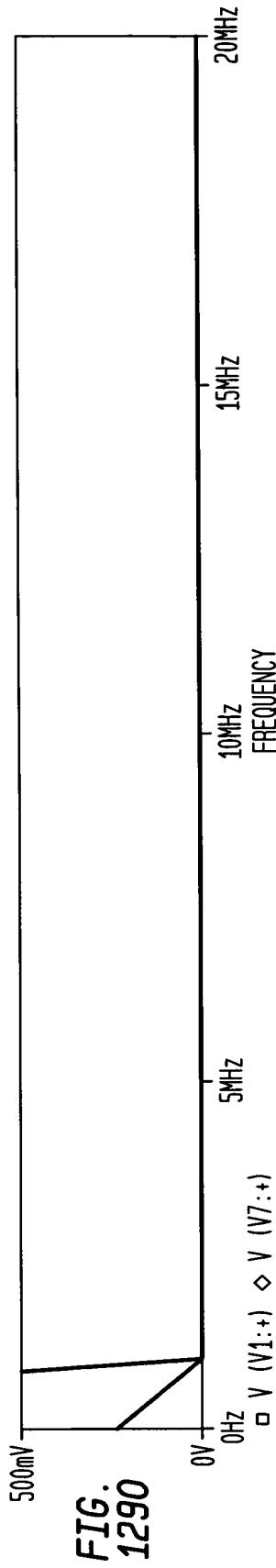
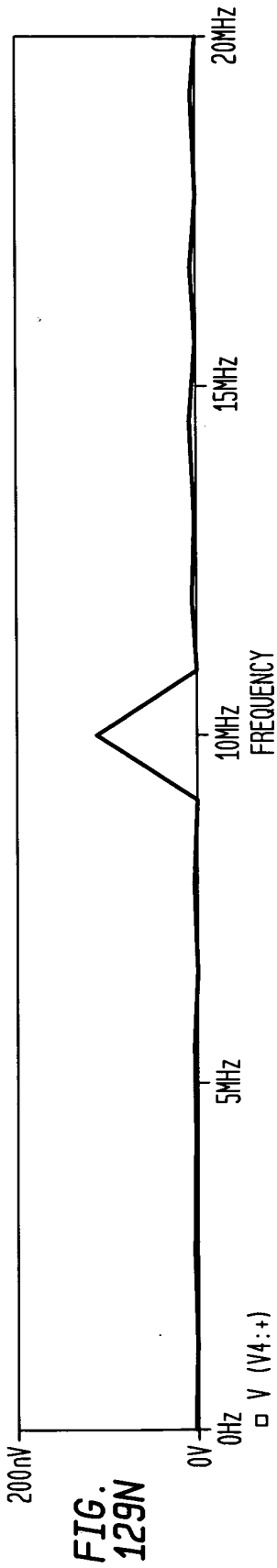




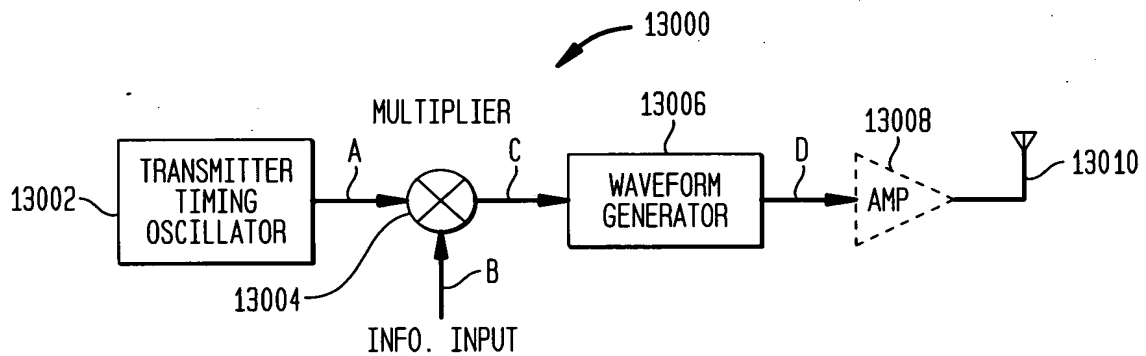




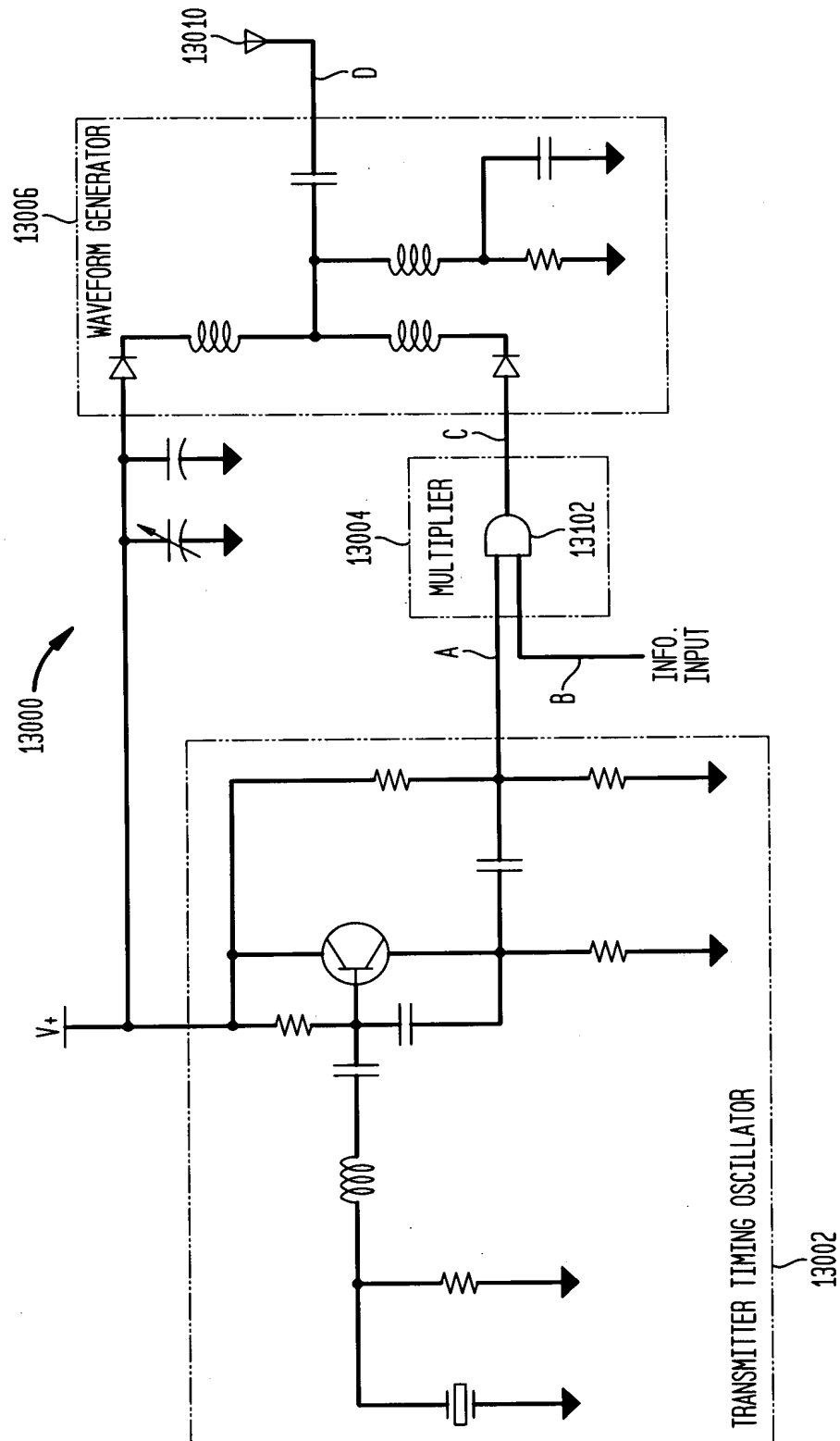
A1: (1.0000G, 3.9326m) A2: (788.000M, 9.0941u) DIFF(A): (212.000M, -3.9235m)



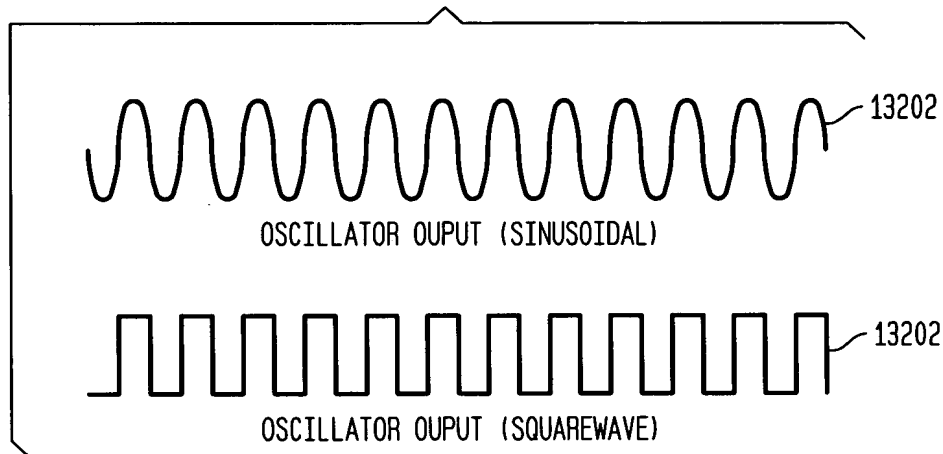
**FIG. 130**



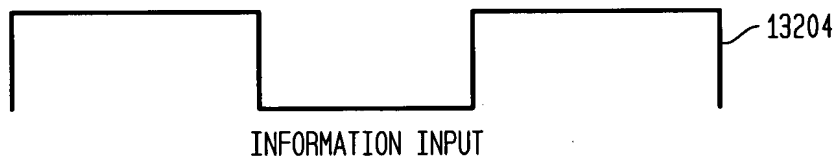
**FIG. 131**



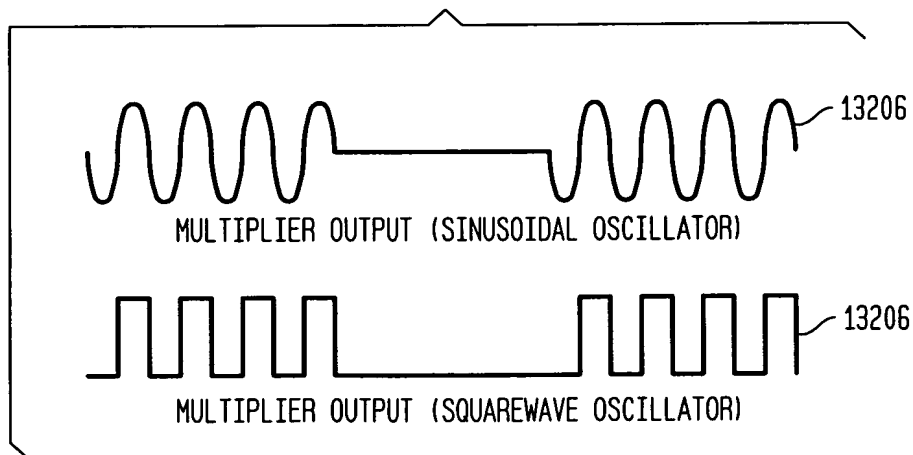
**FIG. 132A**



**FIG. 132B**



**FIG. 132C**



**FIG. 132D**

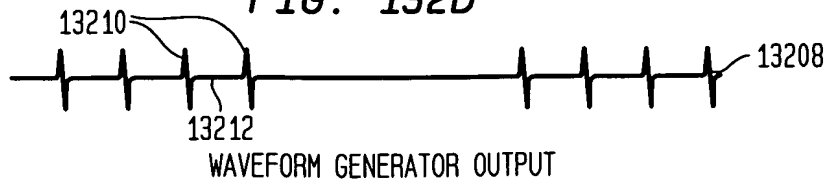


FIG. 133

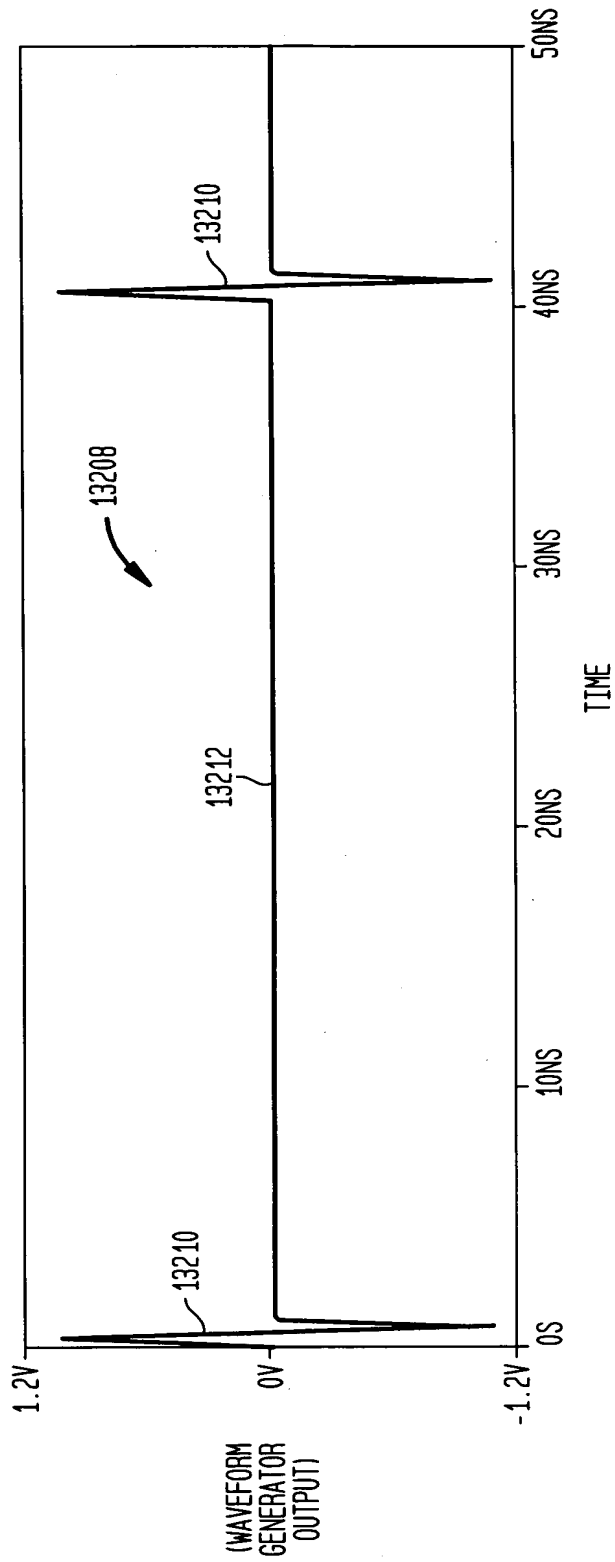


FIG. 134

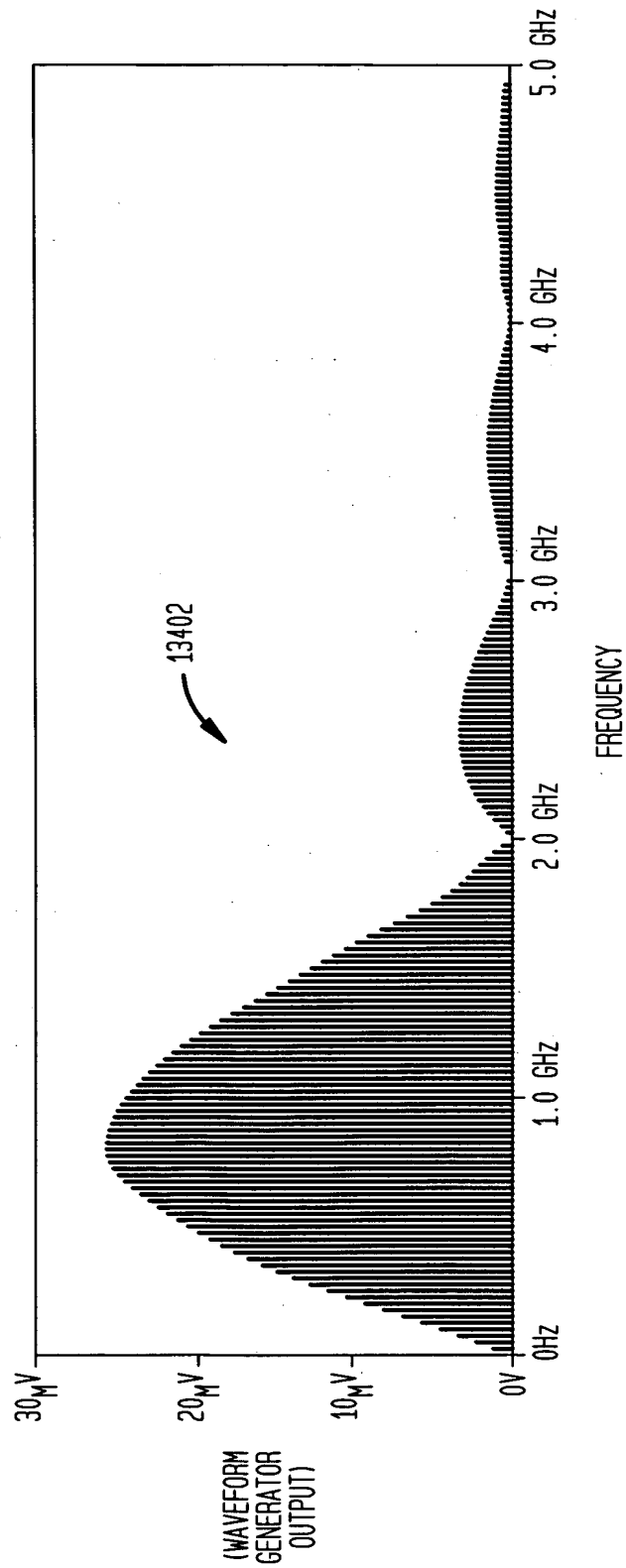
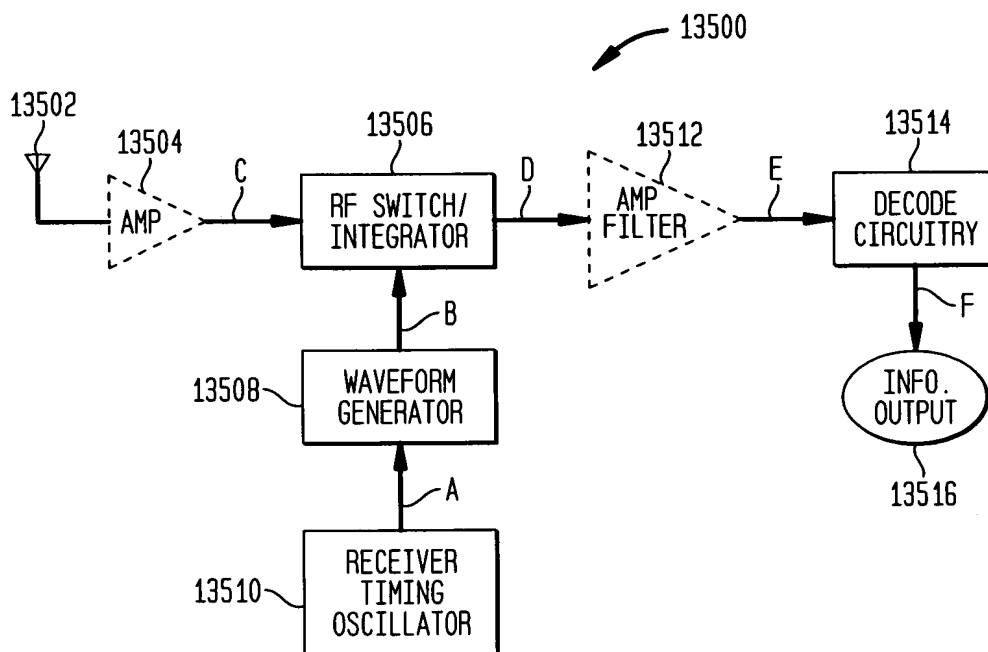
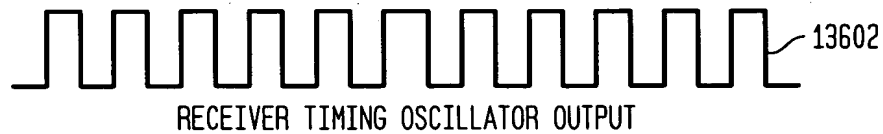


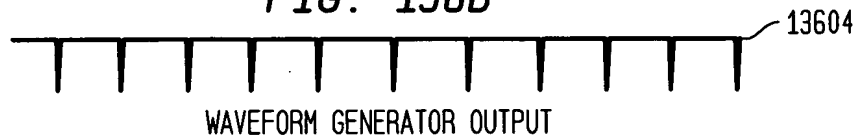
FIG. 135



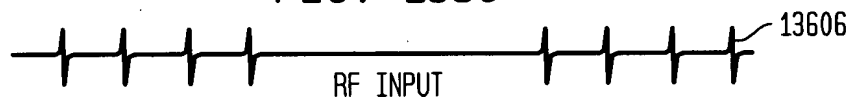
**FIG. 136A**



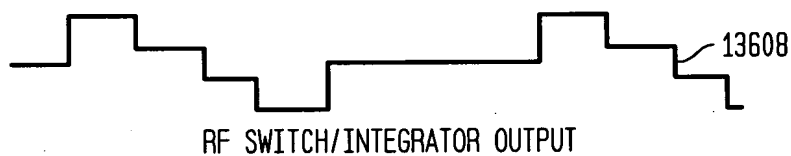
**FIG. 136B**



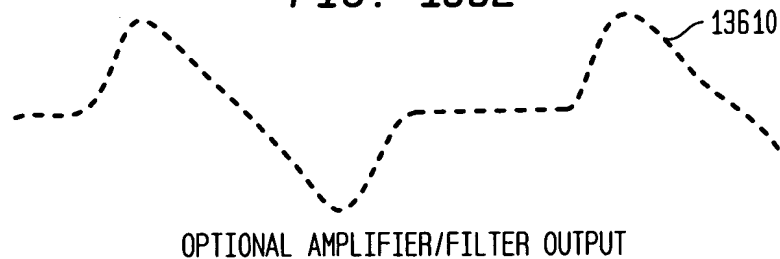
**FIG. 136C**



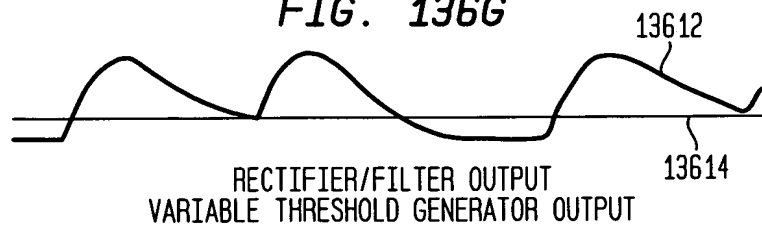
**FIG. 136D**



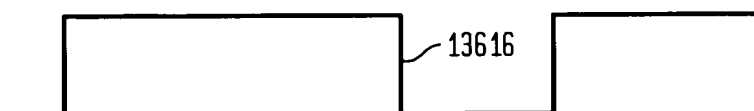
**FIG. 136E**



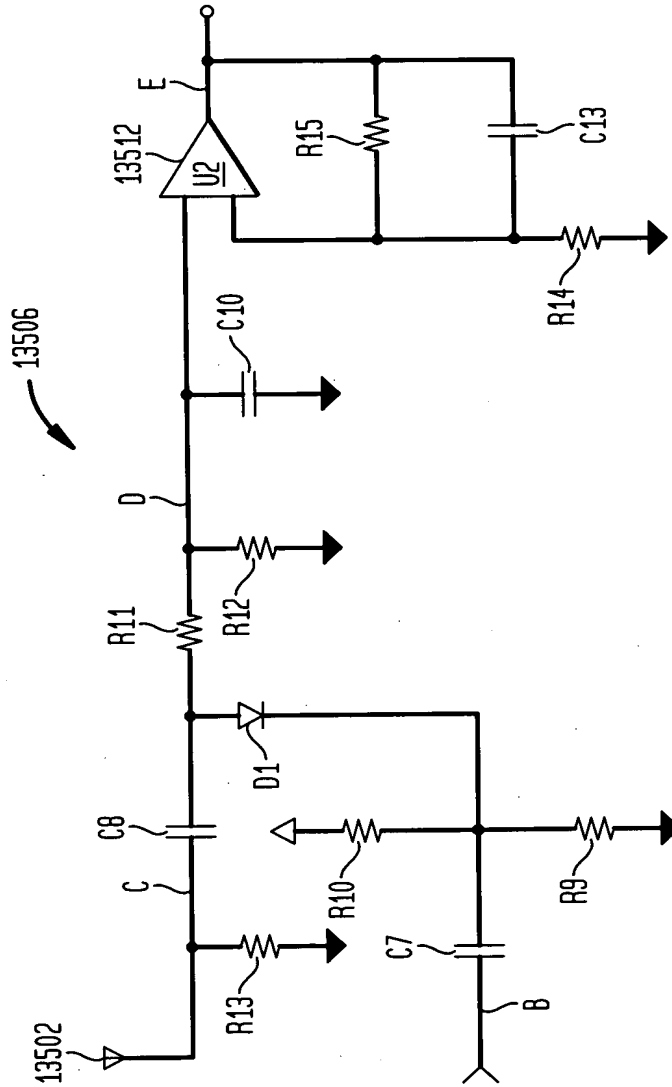
**FIG. 136G**



**FIG. 136F**



**FIG. 137**



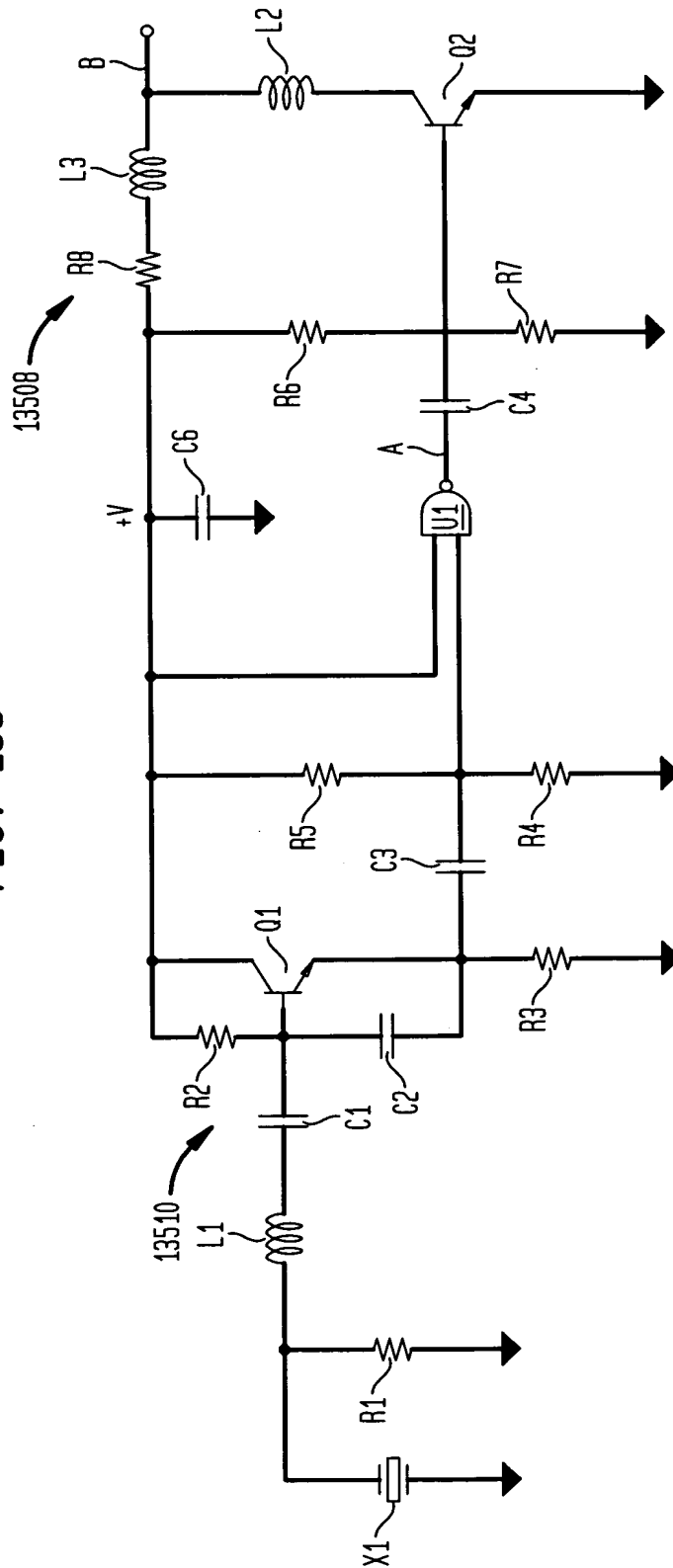
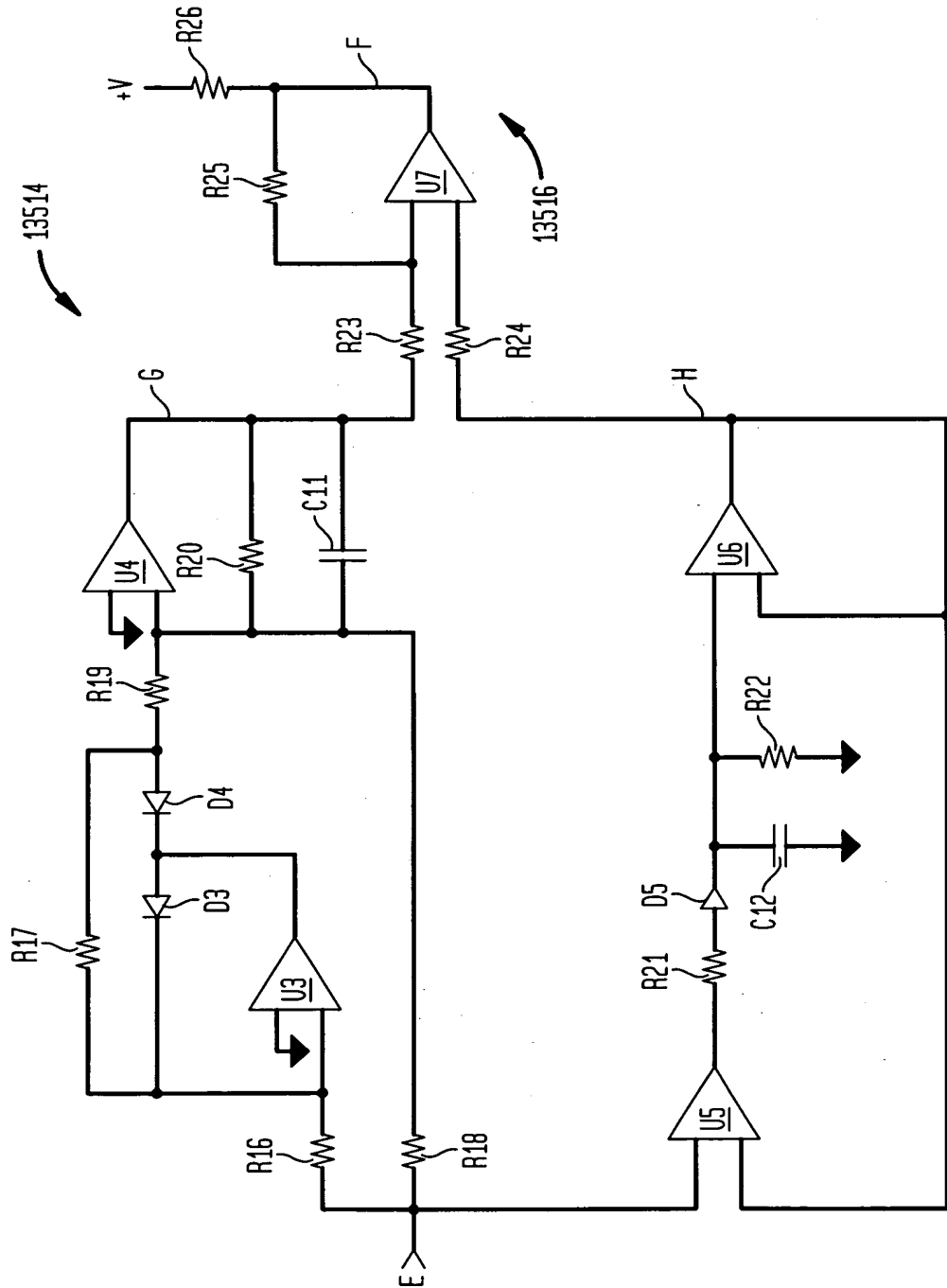
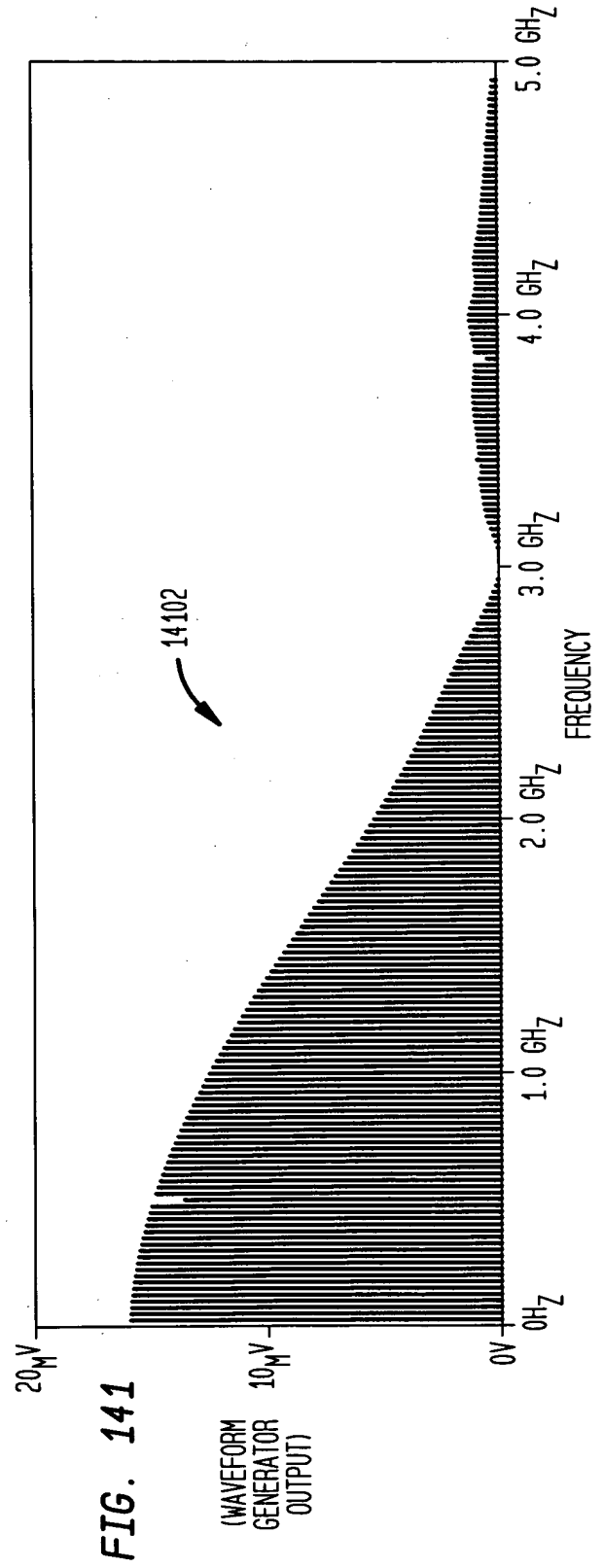
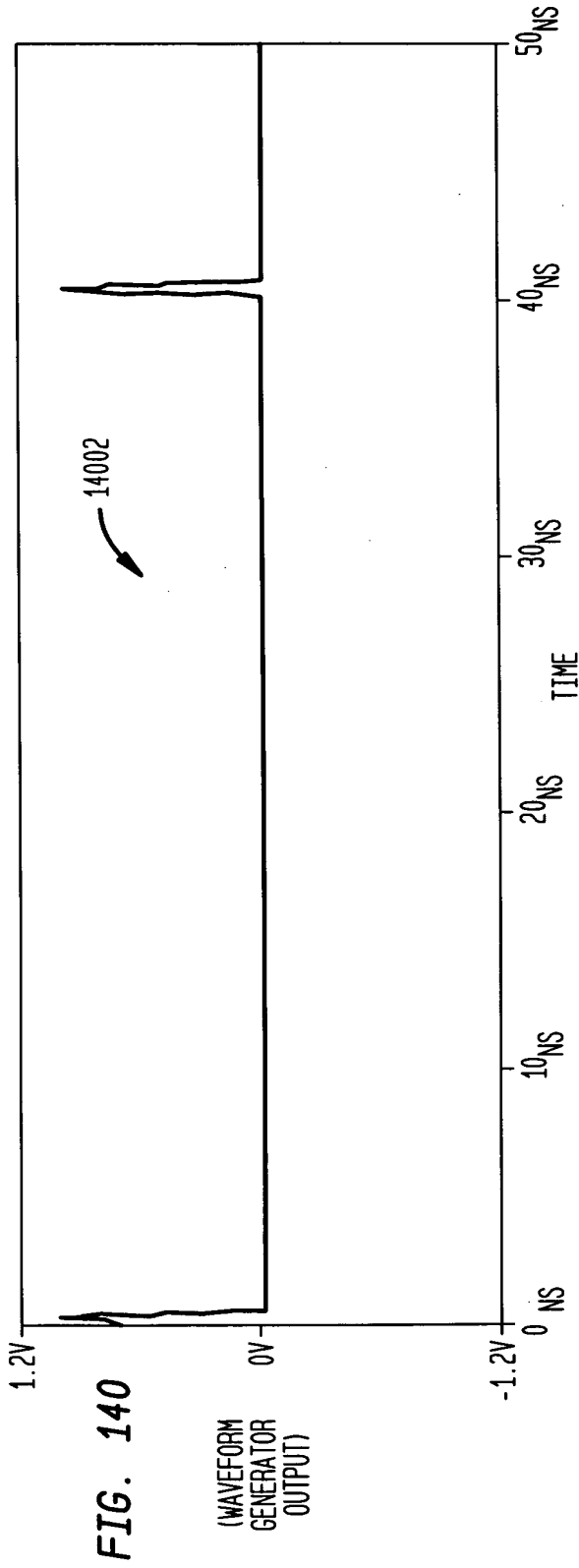
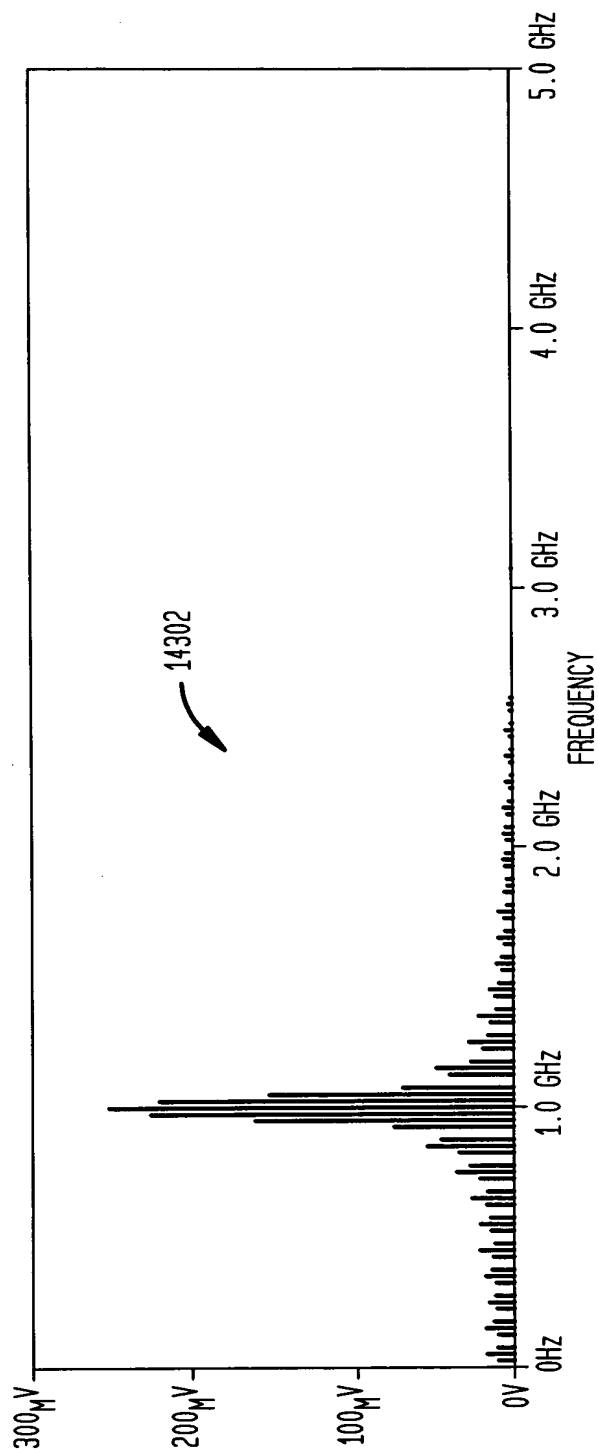
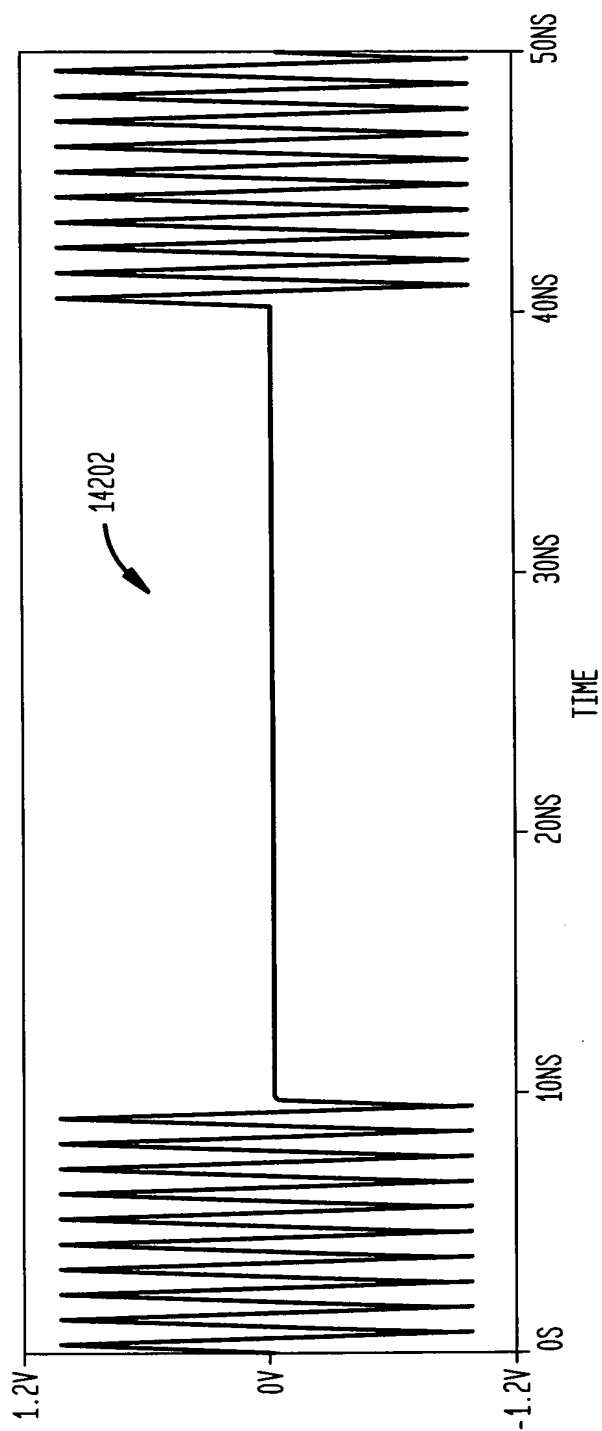


FIG. 139

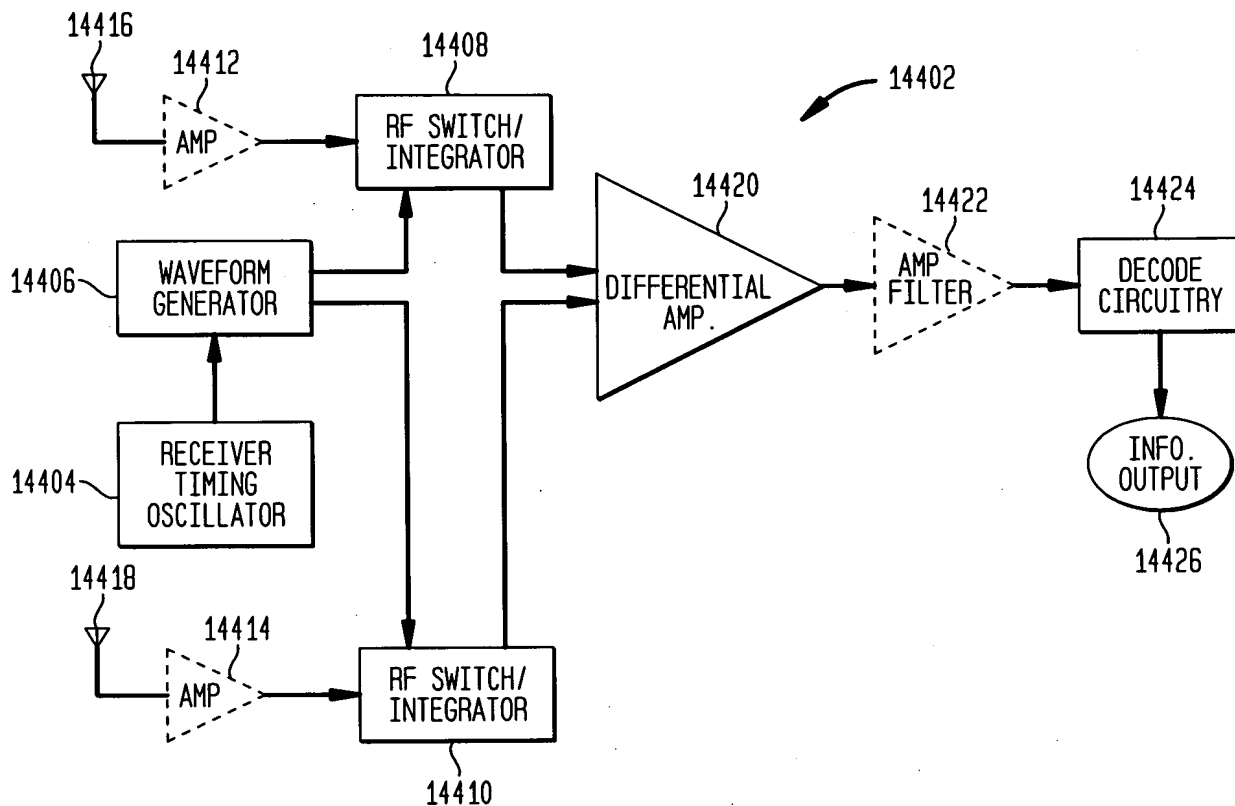






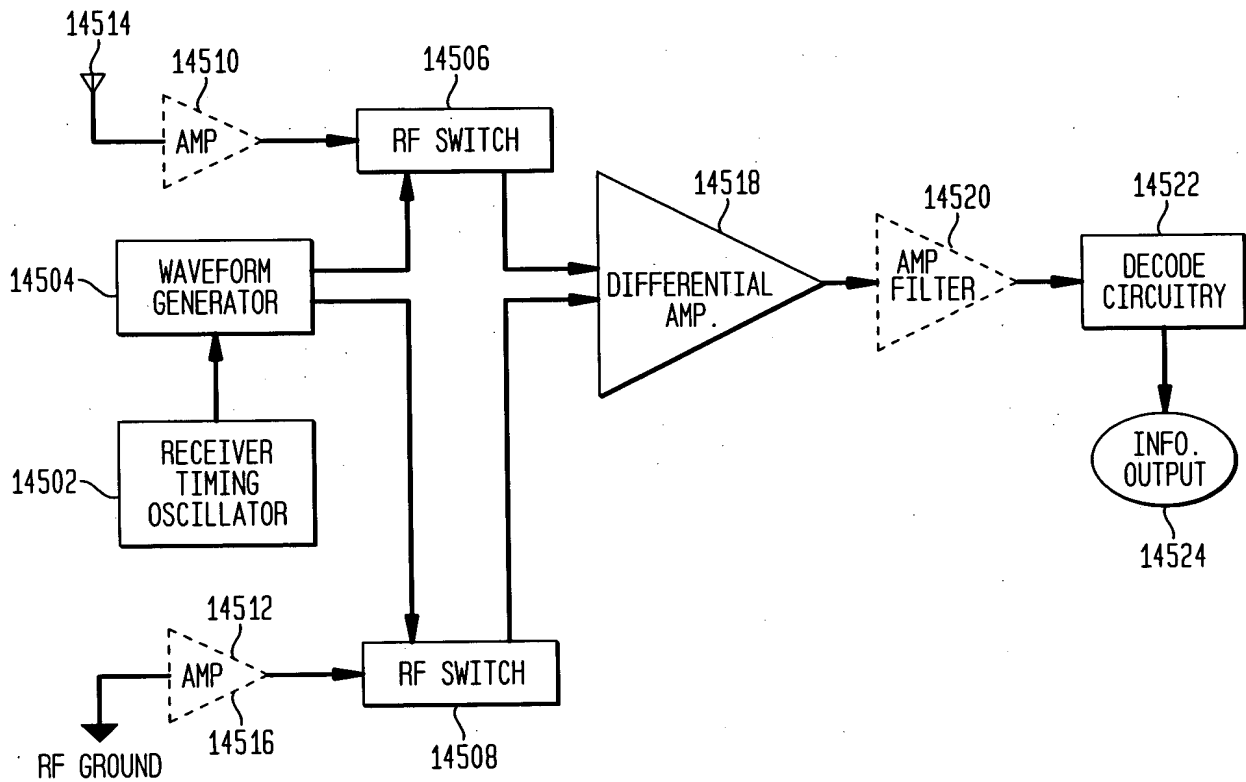
**FIG. 144**

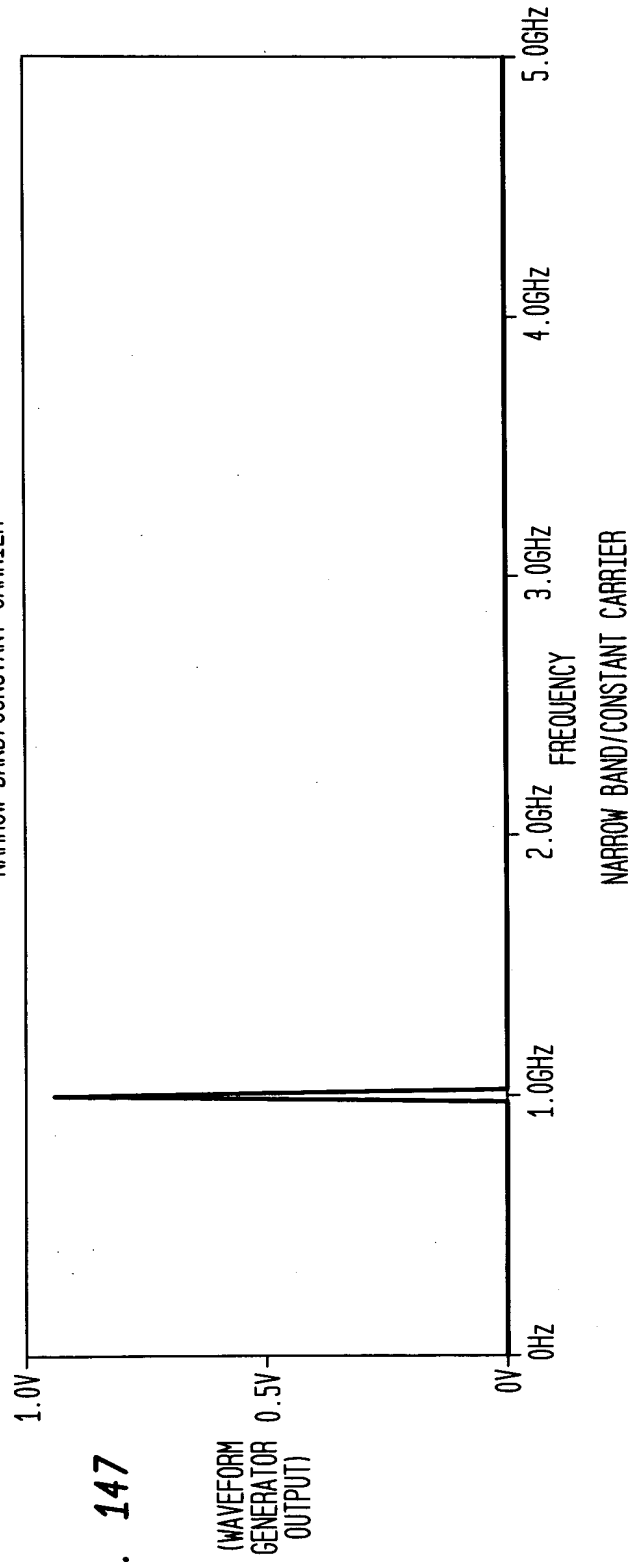
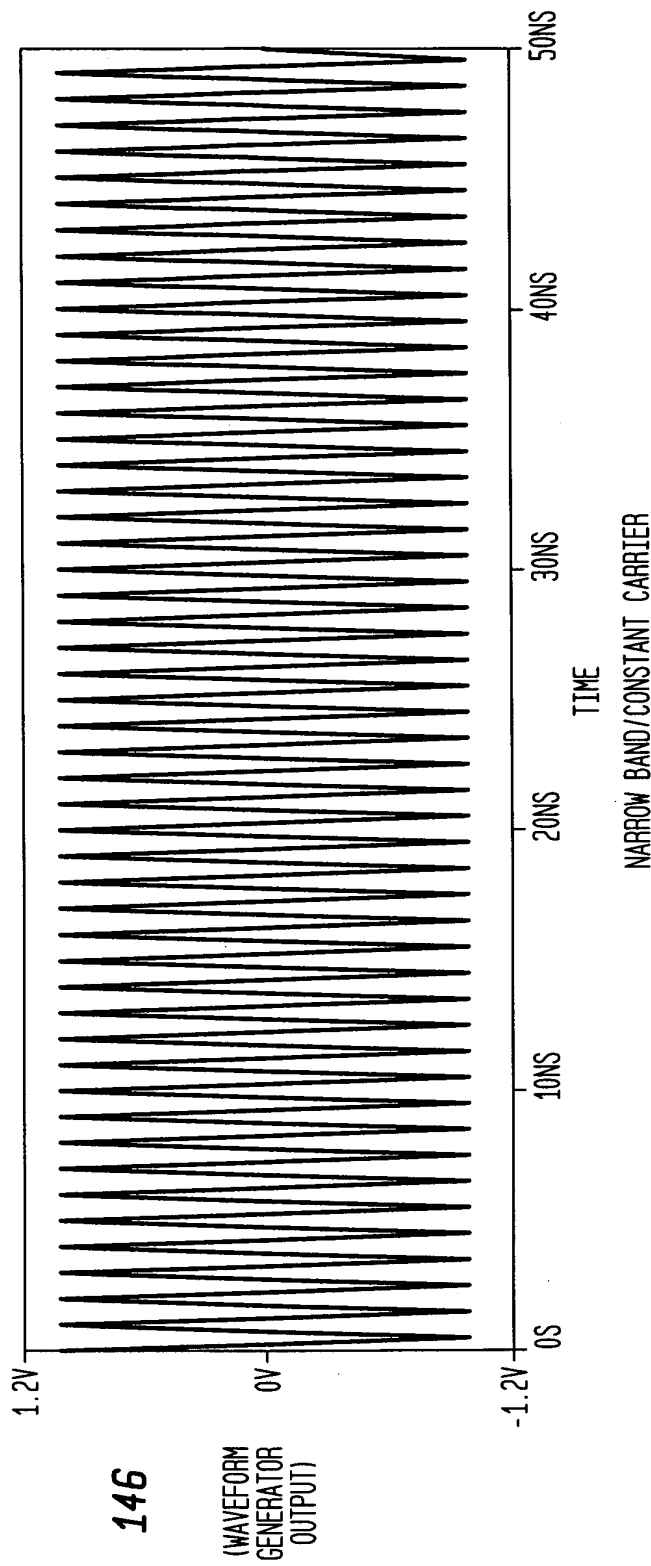
RF DIFFERENTIAL RECEIVER



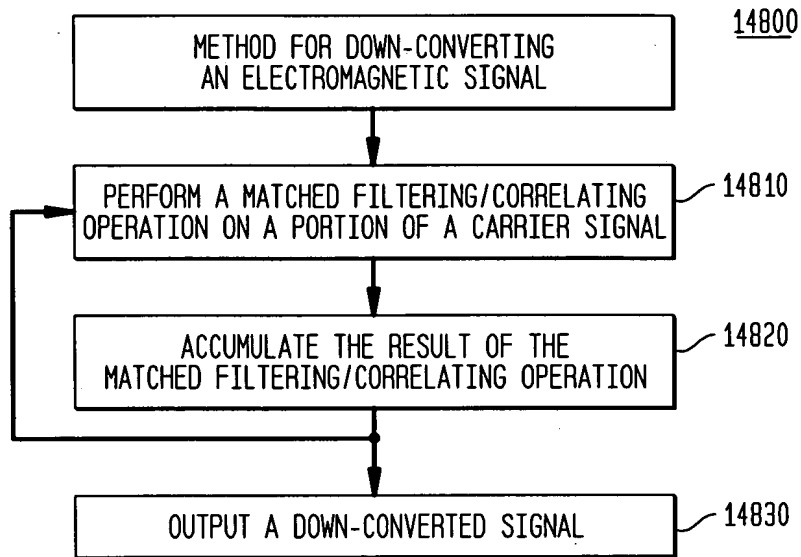
**FIG. 145**

PSEUDO DIFFERENTIAL RECEIVER

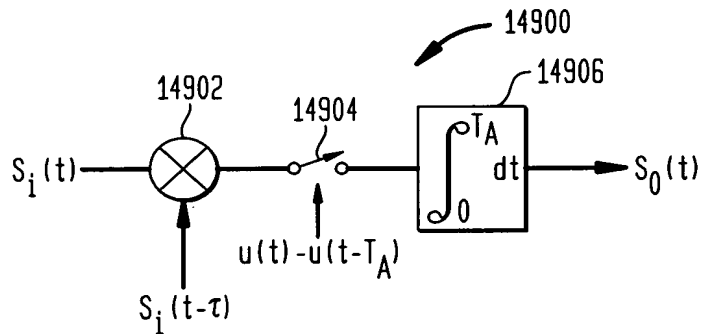




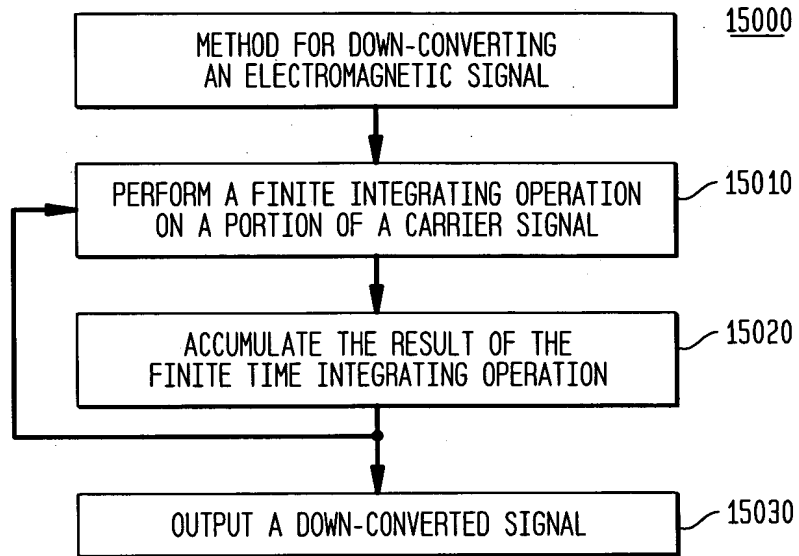
**FIG. 148**



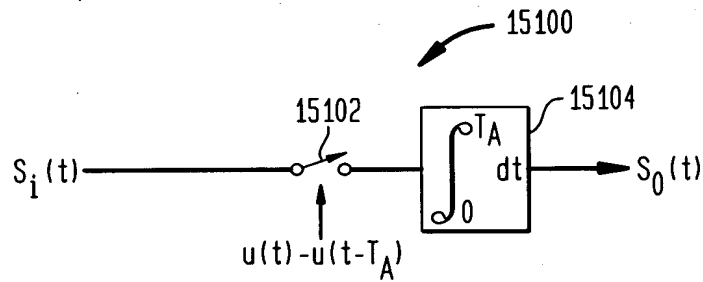
**FIG. 149**



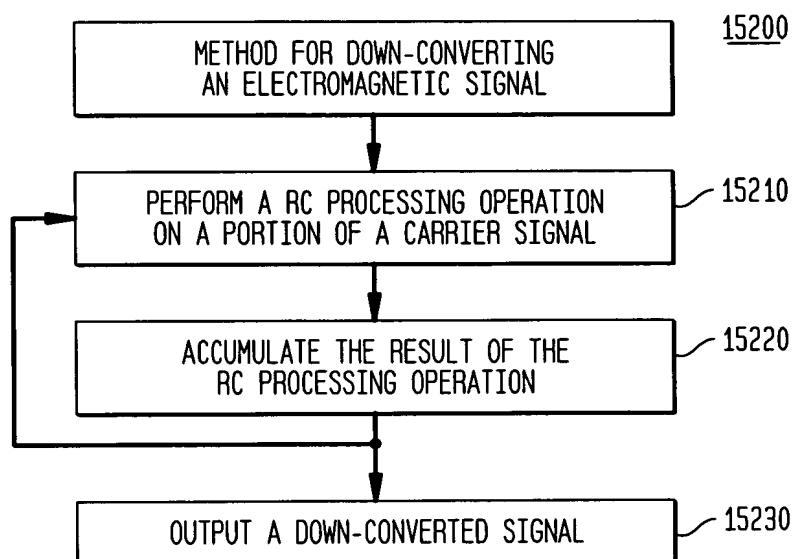
**FIG. 150**



**FIG. 151**



**FIG. 152**



**FIG. 153**

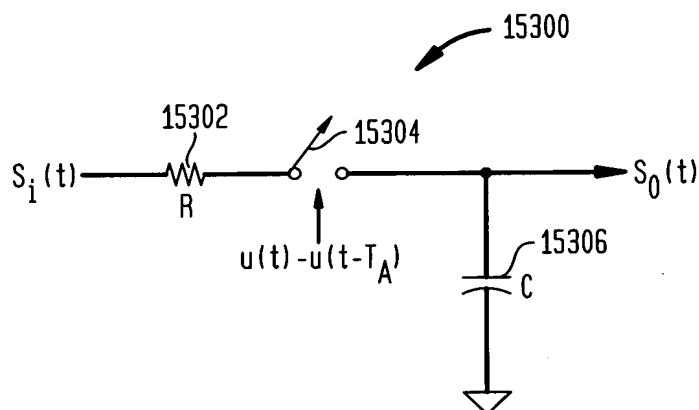


FIG. 154

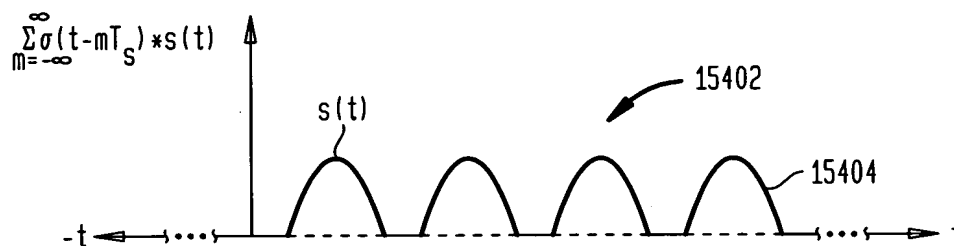


FIG. 155

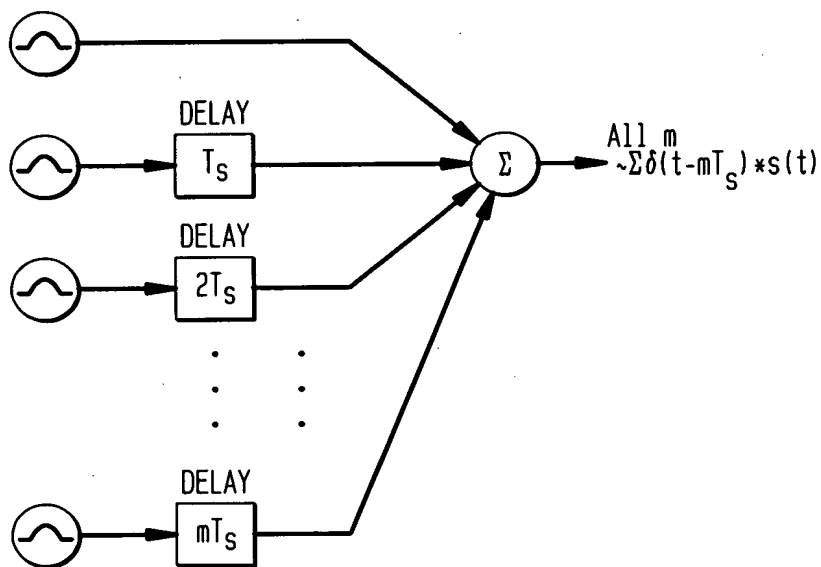


FIG. 156

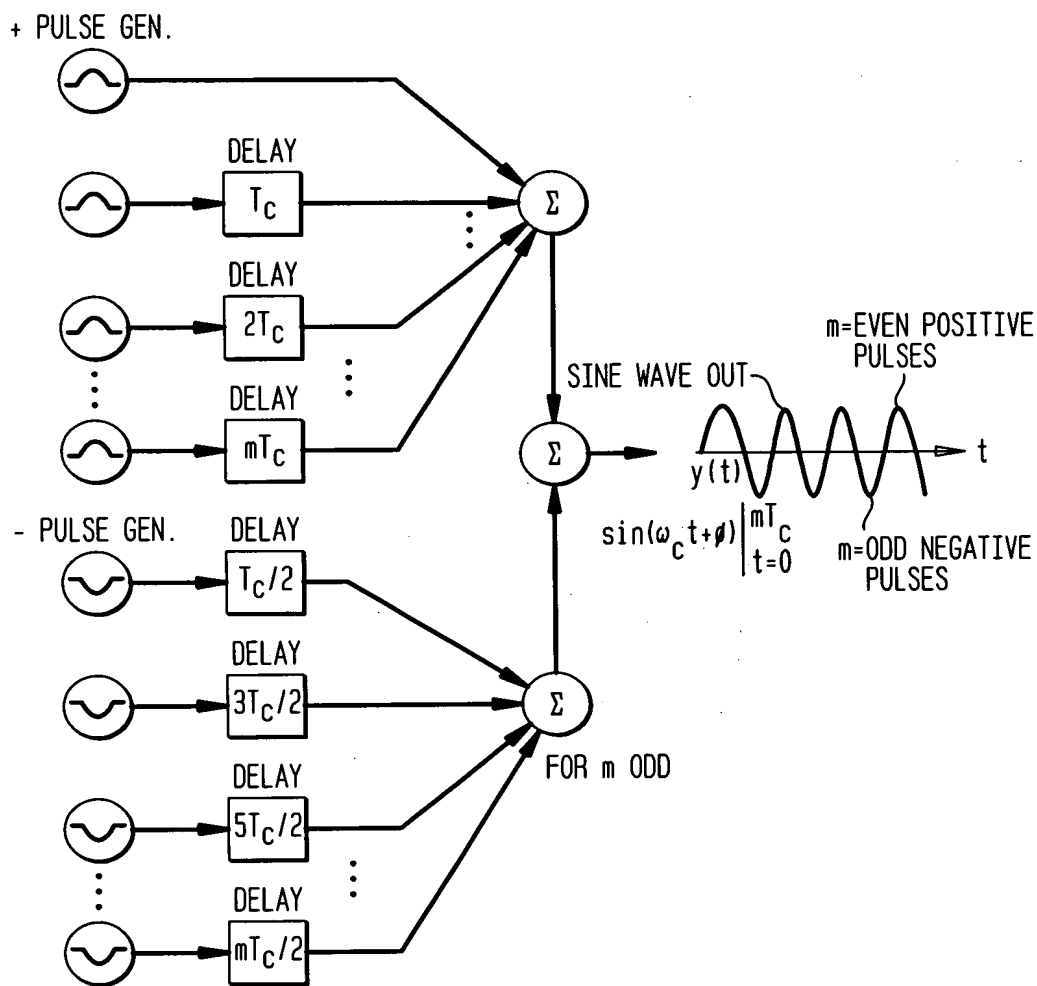


FIG. 157

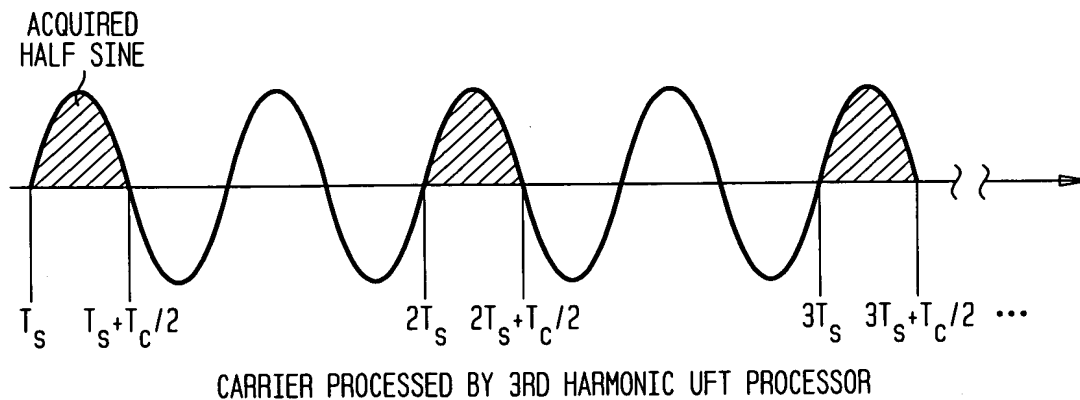


FIG. 158

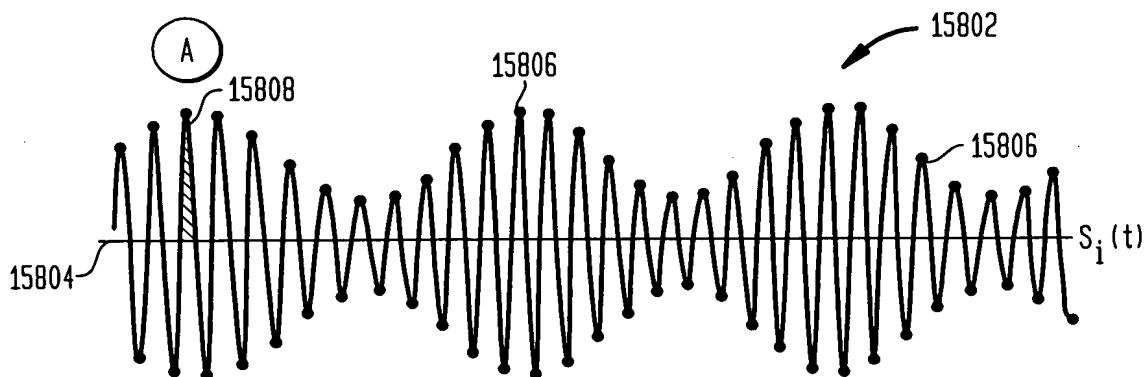
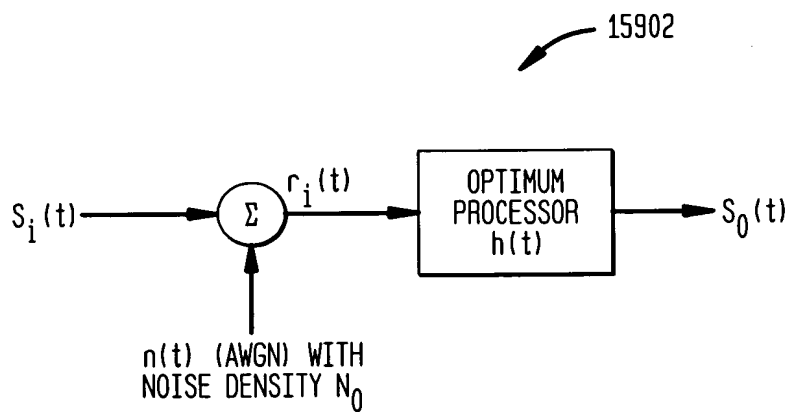
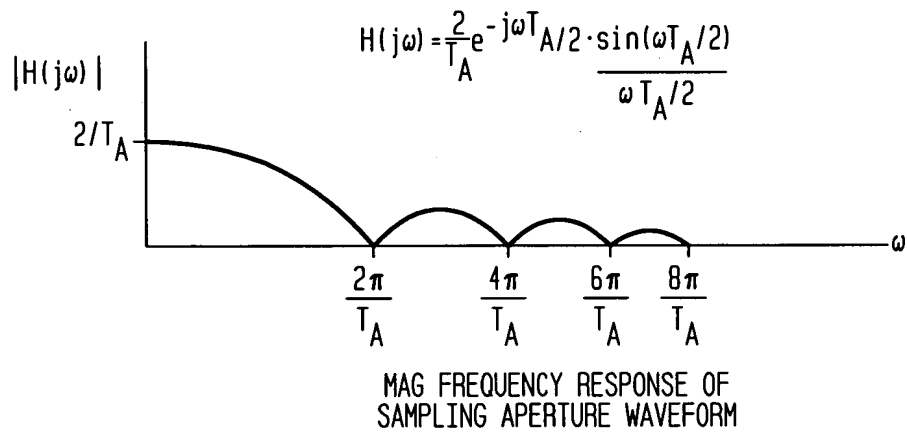


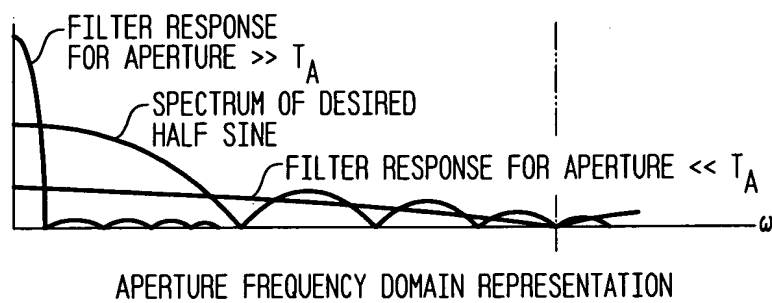
FIG. 159



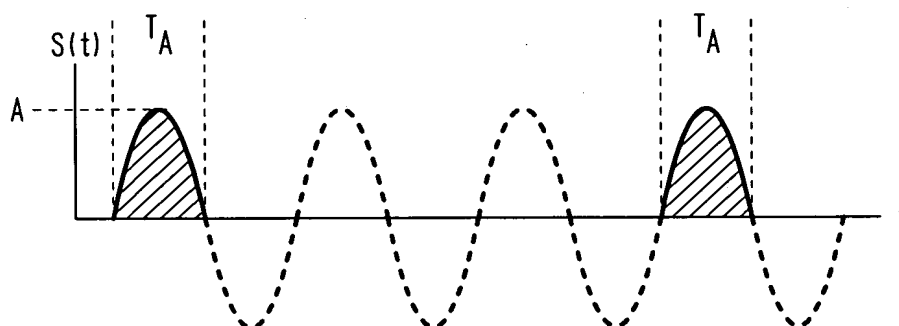
**FIG. 160**



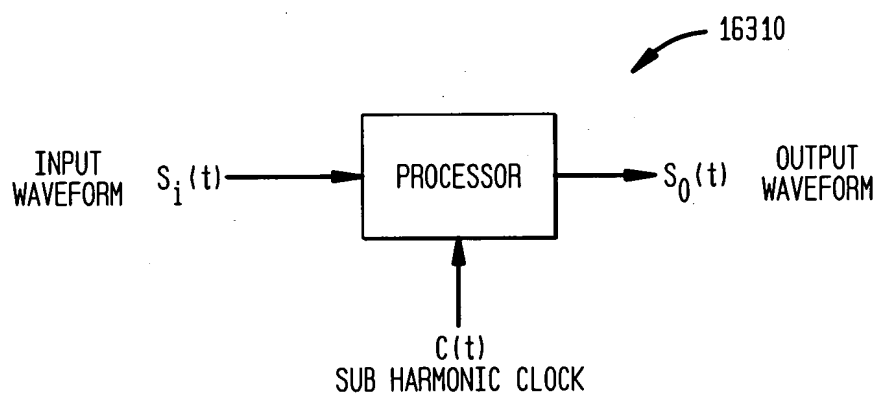
**FIG. 161**



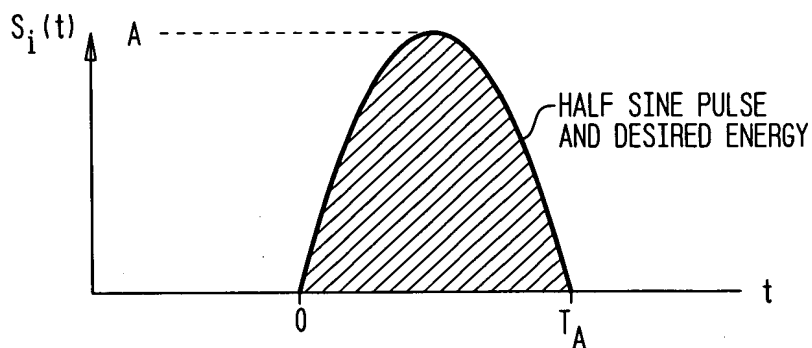
**FIG. 162**



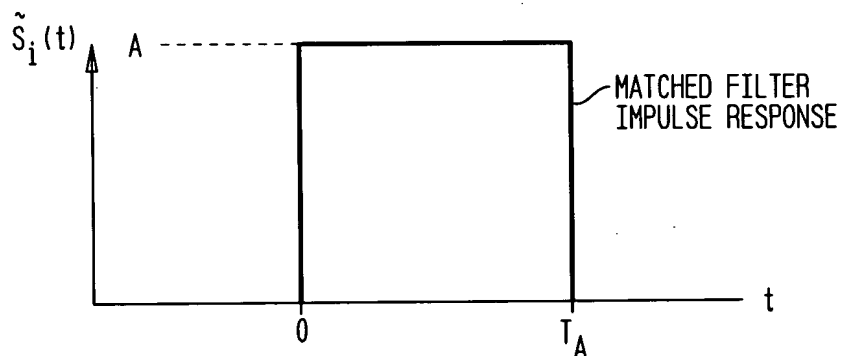
**FIG. 163**



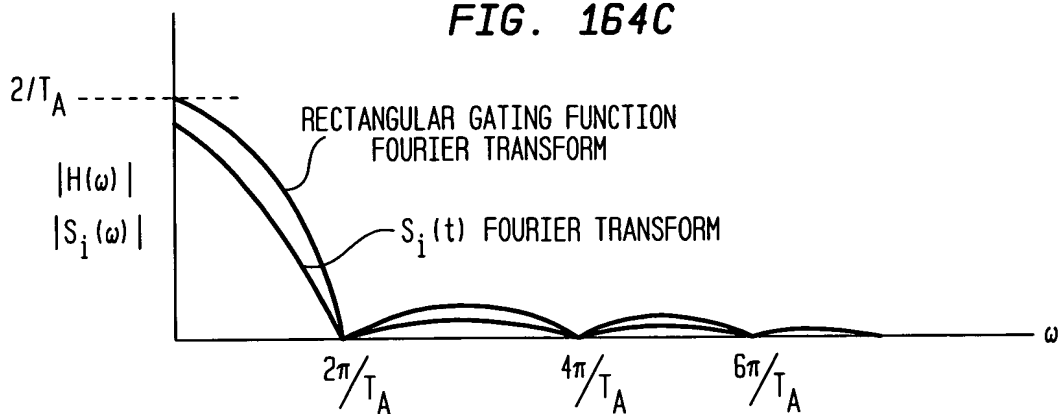
**FIG. 164A**



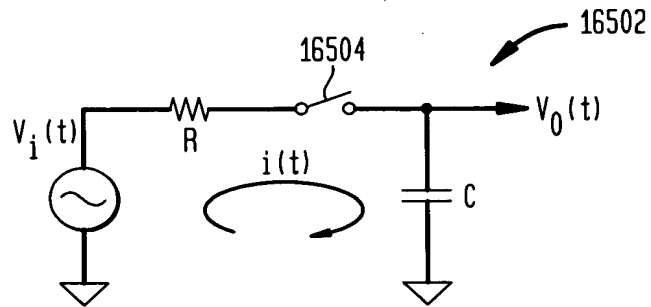
**FIG. 164B**



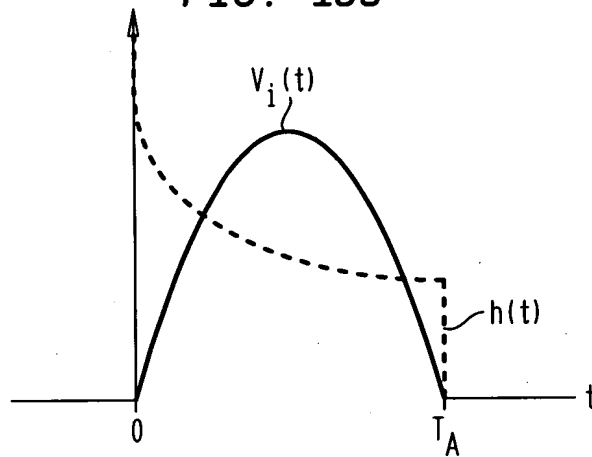
**FIG. 164C**



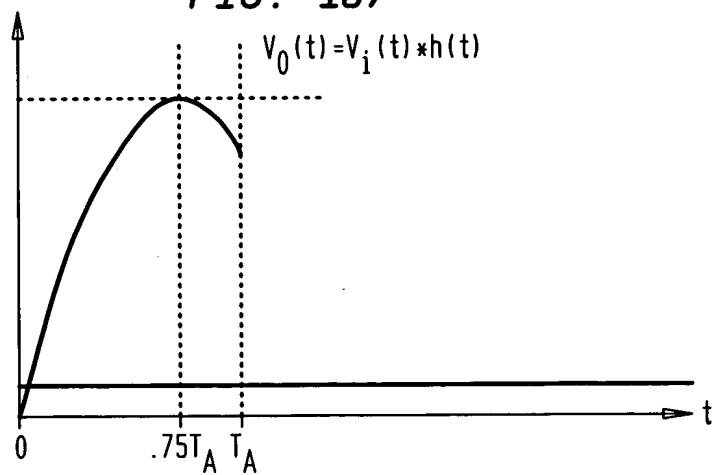
**FIG. 165**



**FIG. 166**

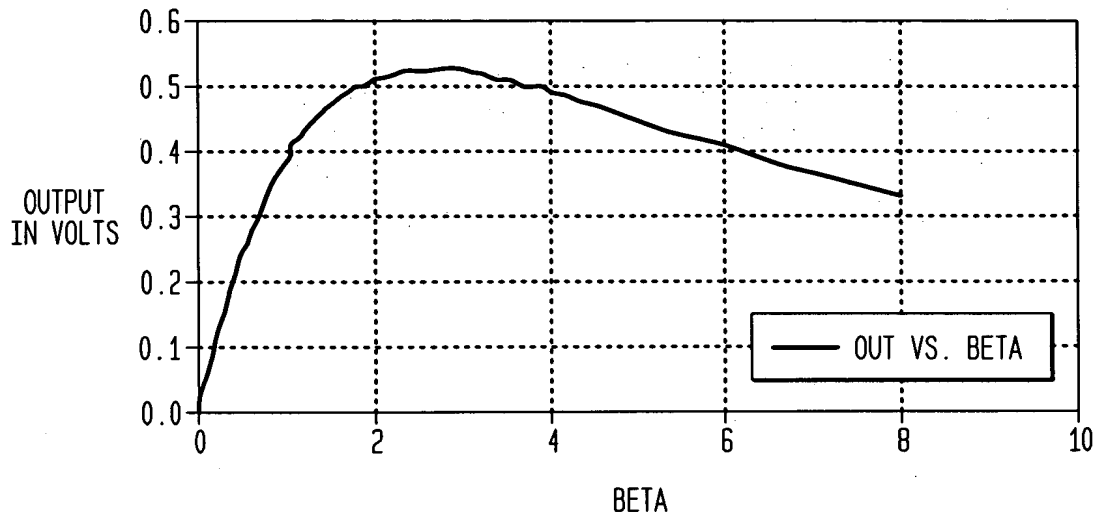


**FIG. 167**



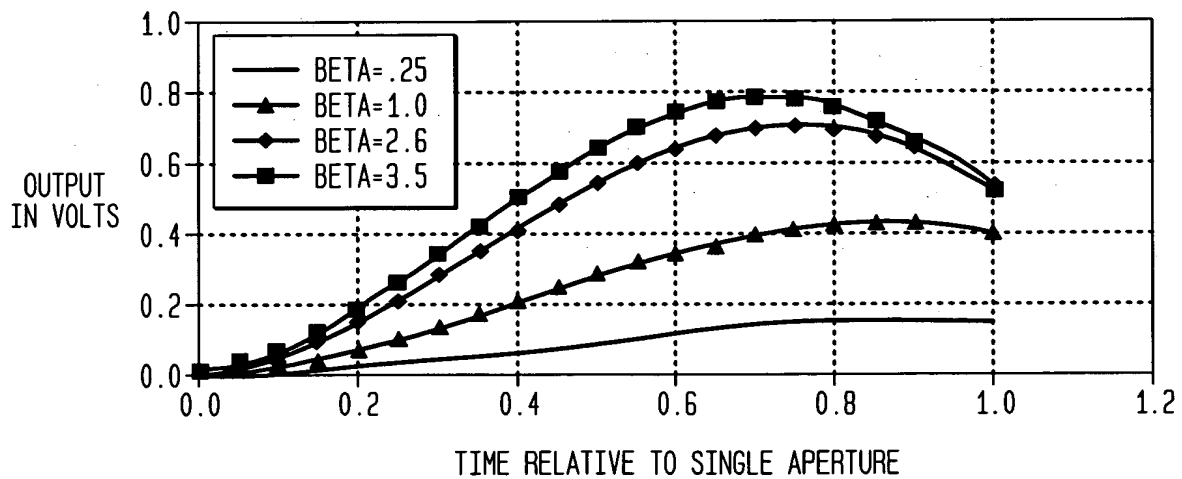
**FIG. 168**

UFT OUTPUT VS. BETA FOR SIMPLE RC IMPLEMENTATION



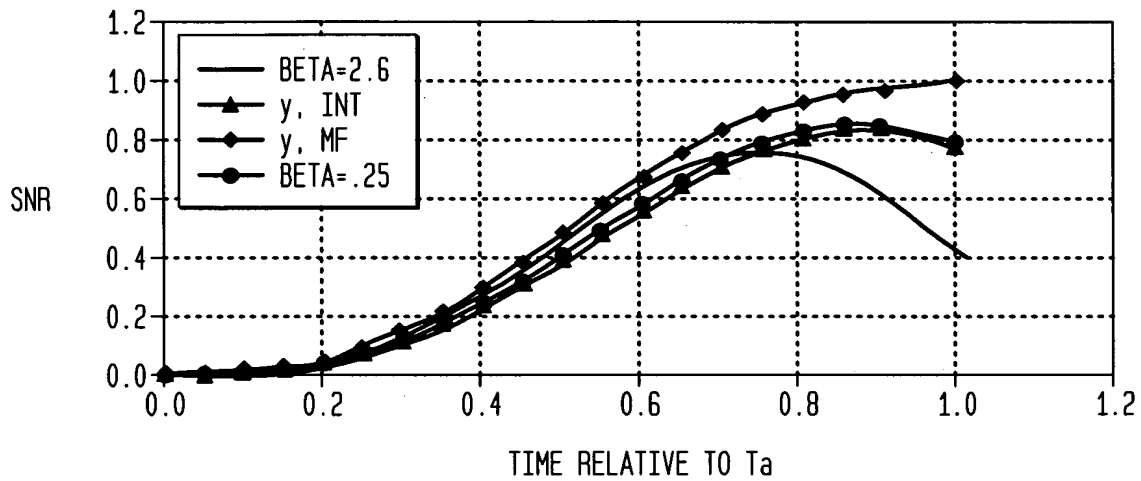
**FIG. 169**

UFT OUTPUT RESPONSE VS. NORMALIZED TIME WITH BETA AS A PARAMETER



**FIG. 170**

NORMALIZED SNR FOR MF, INT., RC UFT  
 IMPLEMENTATIONS, No.=1,  $T_a=A$ ,  $A=1$



**FIG. 171**

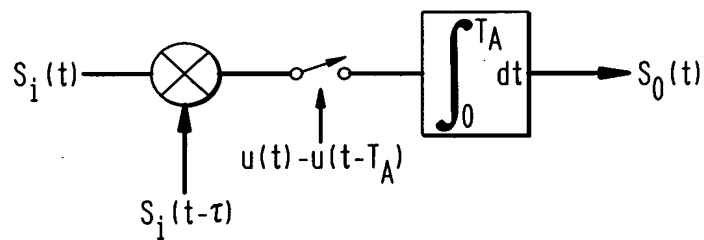


FIG. 172

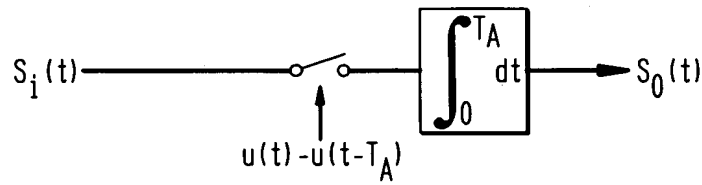
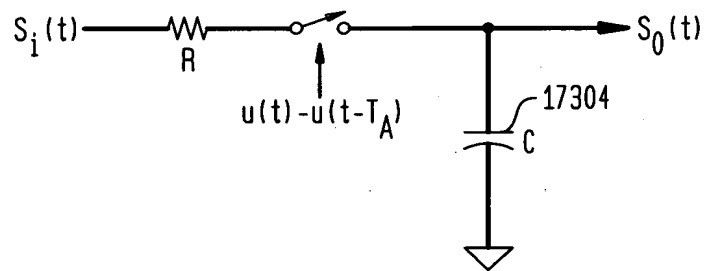
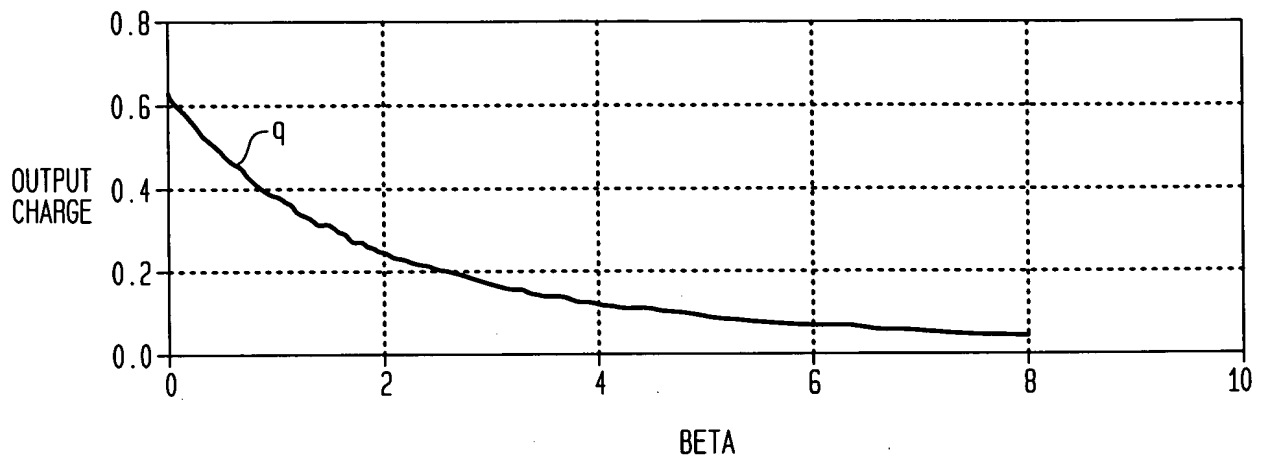


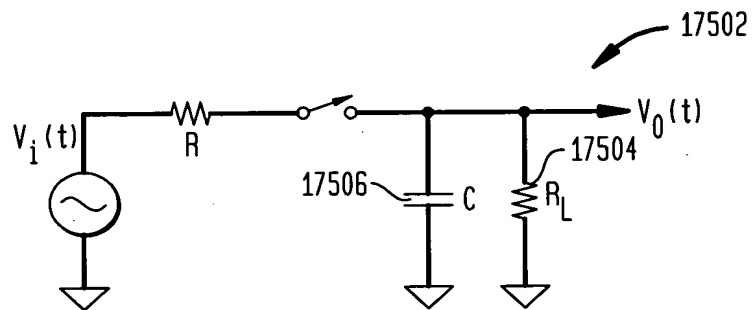
FIG. 173



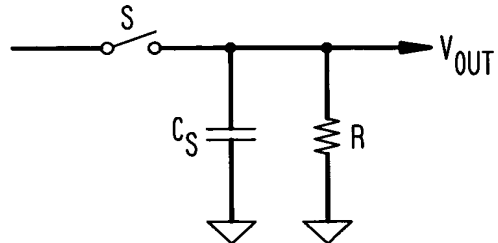
**FIG. 174**  
 UFT OUTPUT CHARGE TRANSFER



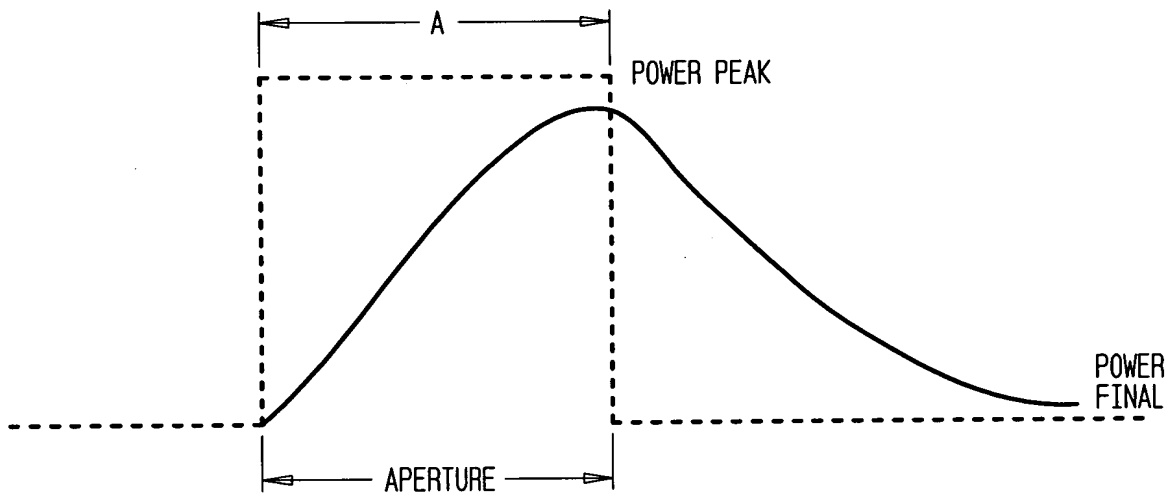
**FIG. 175A**



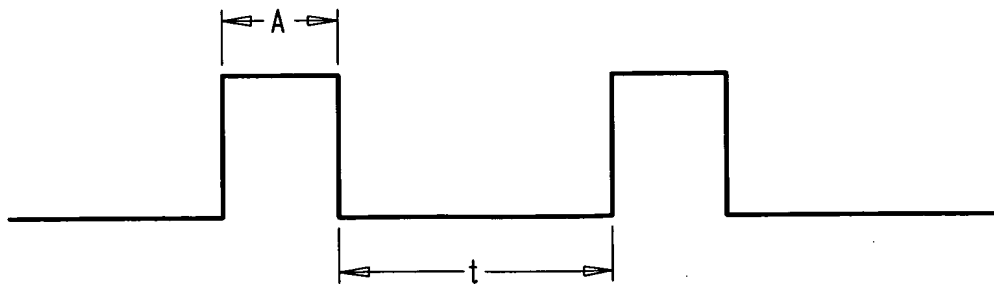
**FIG. 175B**



**FIG. 175C**

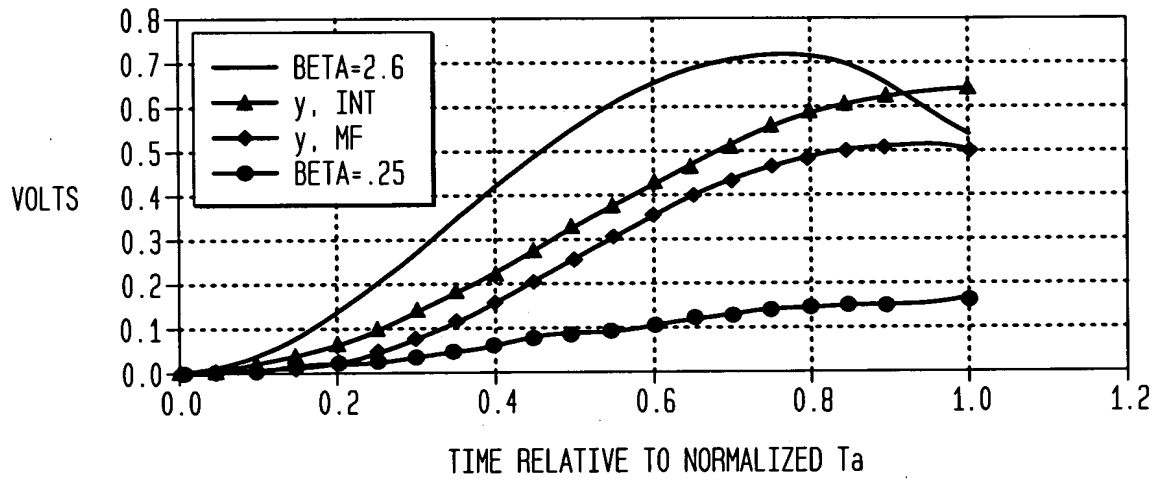


**FIG. 175D**



**FIG. 176**

OUTPUT VOLTAGE FOR 3 UFT PROCESSORS;  
MATCHED FILTER, INTEGRATOR, RC



**FIG. 177A**

NORMALIZED SNR FOR MF, INT., RC UFT  
IMPLEMENTATIONS, No.=1,  $T_a=1$ ,  $A=1$

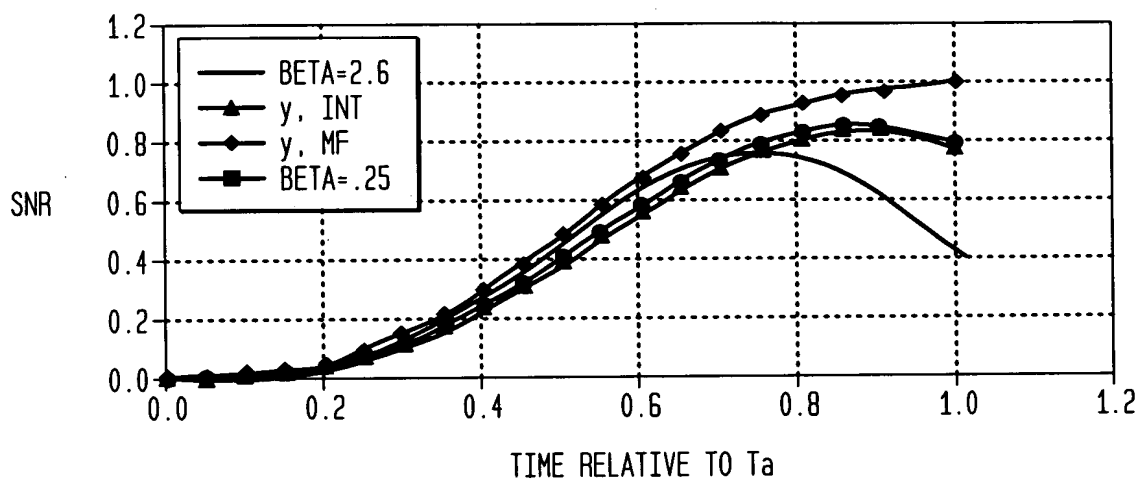


FIG. 177B

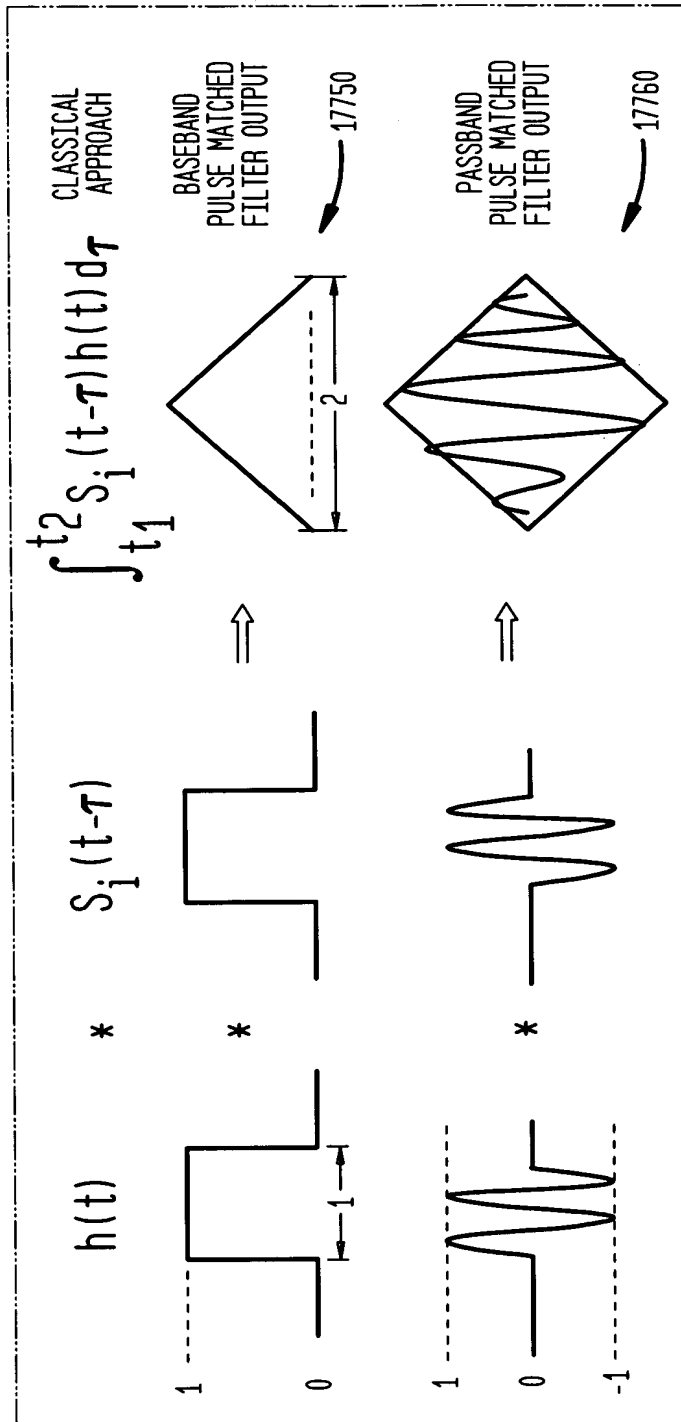


FIG. 177C

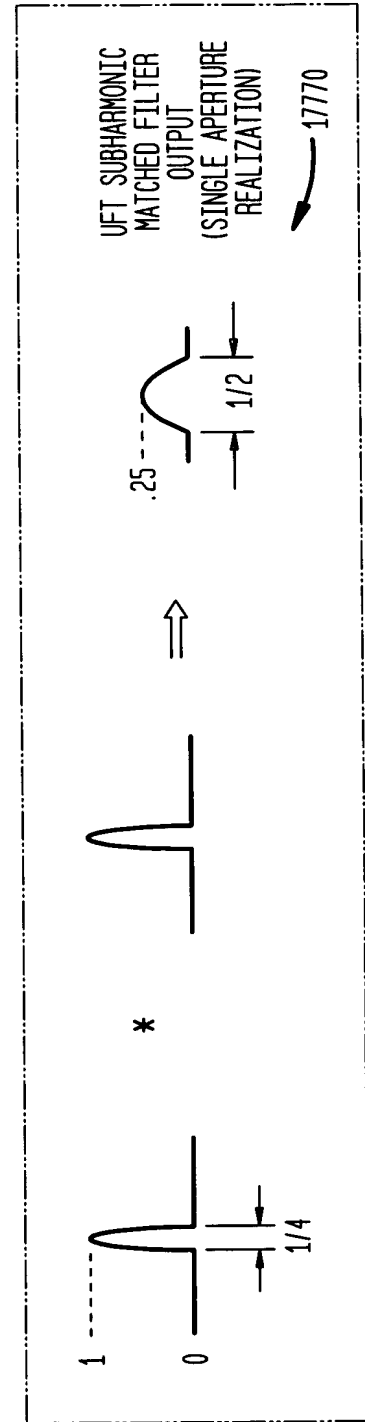


FIG. 177D

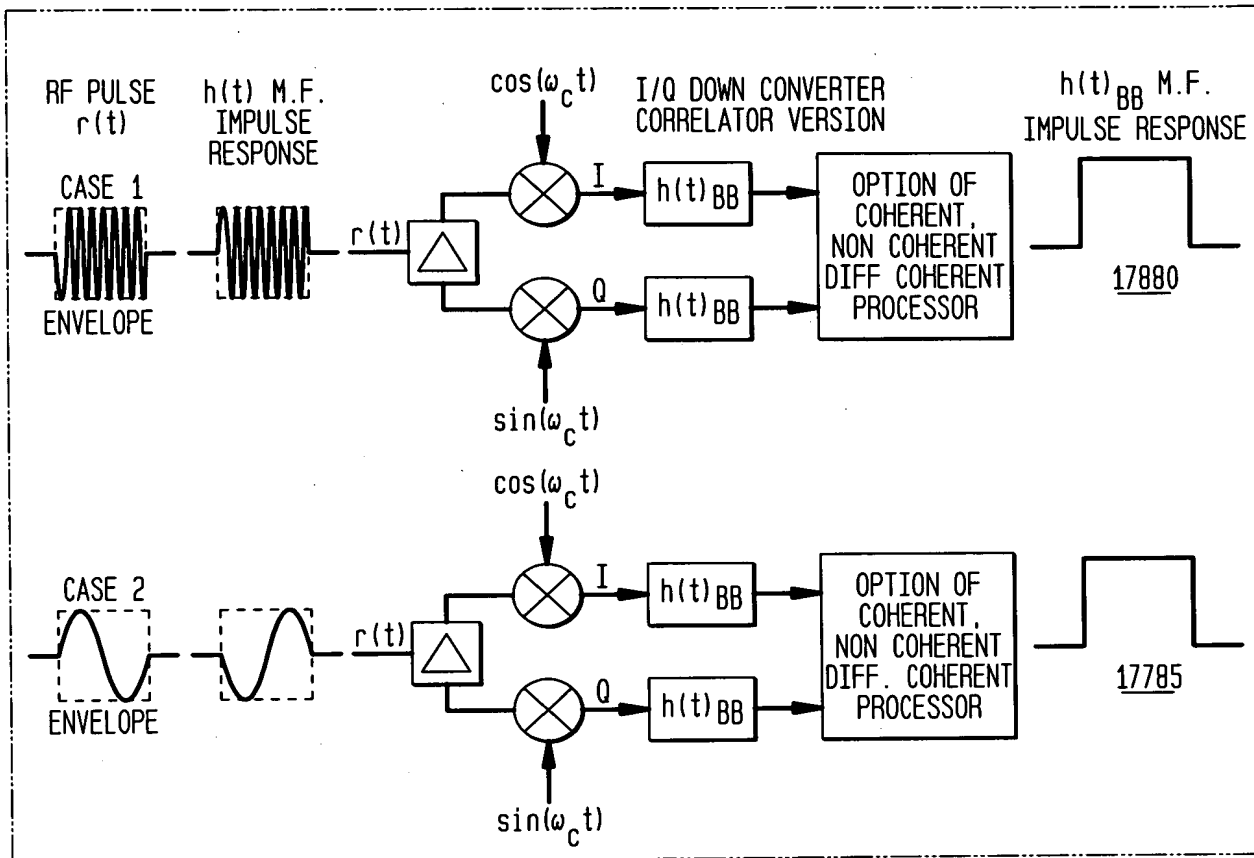


FIG. 177E

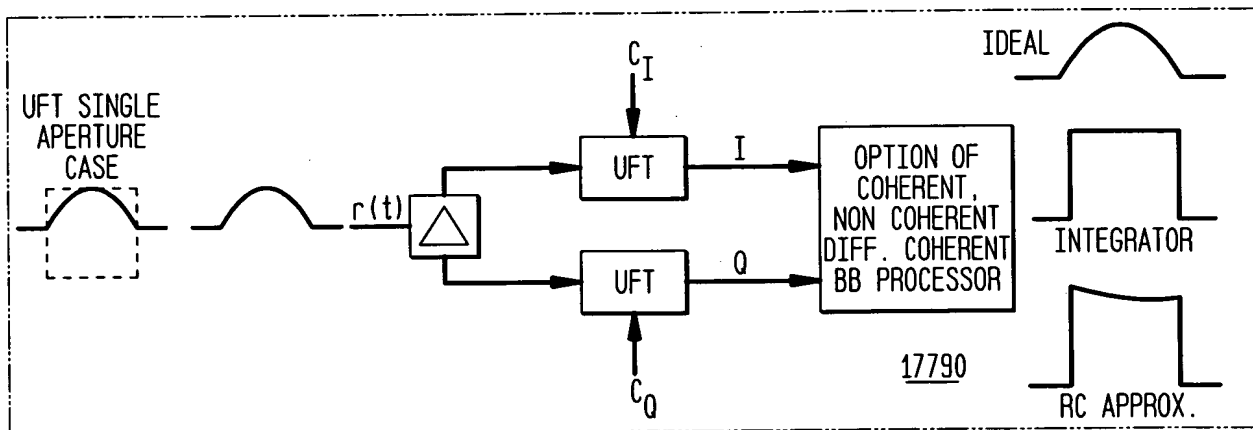
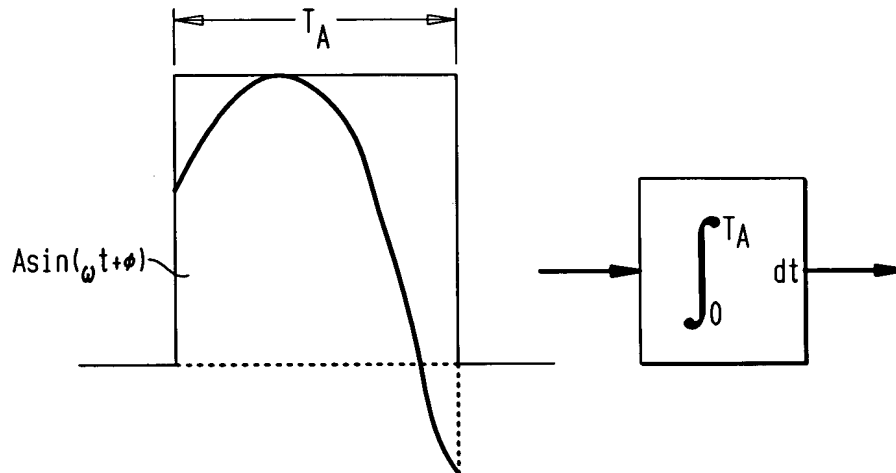


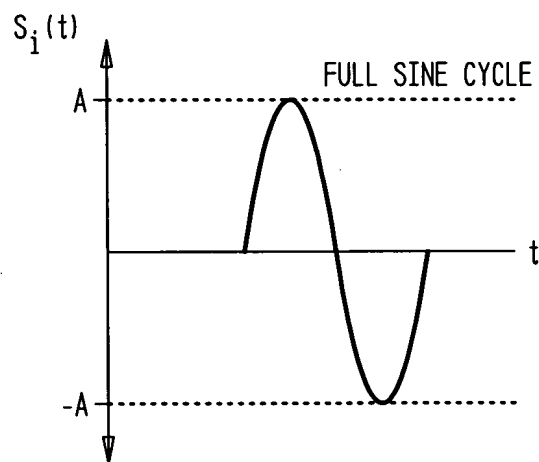
FIG. 177F



$$\begin{aligned}
 \int_0^{T_A} A u(t-T_A) \sin(\omega t + \phi) dt &= \int_0^{T_A} A (u(t-T_A) \cos \phi \sin(\omega t) + u(t-T_A) \sin \phi \cos(\omega t)) dt \\
 &= \underbrace{A \cos(\phi)}_{\text{CONSTANT}} \underbrace{\int_0^{T_A} u(t-T_A) \sin(\omega t) dt}_{\text{UFT CORRELATOR KERNEL}} + \underbrace{A \sin(\phi)}_{\text{CONSTANT}} \underbrace{\int_0^{T_A} u(t-T_A) \cos(\omega t) dt}_{=0} \\
 &= A \cos(\phi) \int_0^{T_A} u(t-T_A) \sin(\omega t) dt
 \end{aligned}$$

- A IS CONSTANT ON A SINE TO SINE BASIS
- $\phi$  IS CONSTANT ON A SINE TO SINE BASIS
- i.e., THE MODULATION RATE DUE TO INFORMATION FOR PHASE AND AMPLITUDE IS VERY SLOW COMPARED TO CARRIER FREQUENCY

**FIG. 178A**



**FIG. 178B**

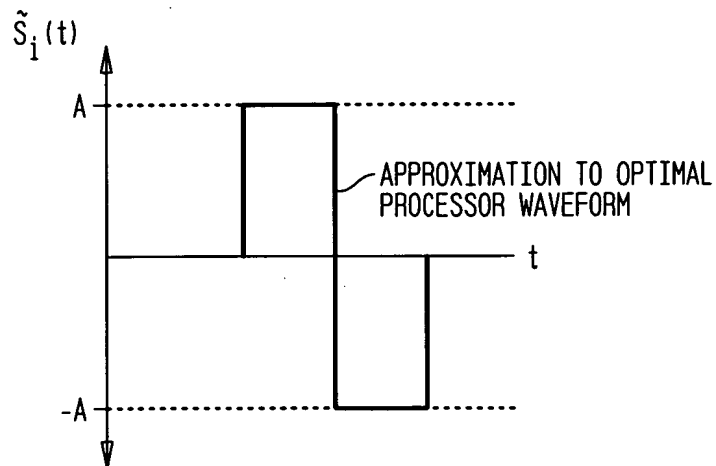


FIG. 179

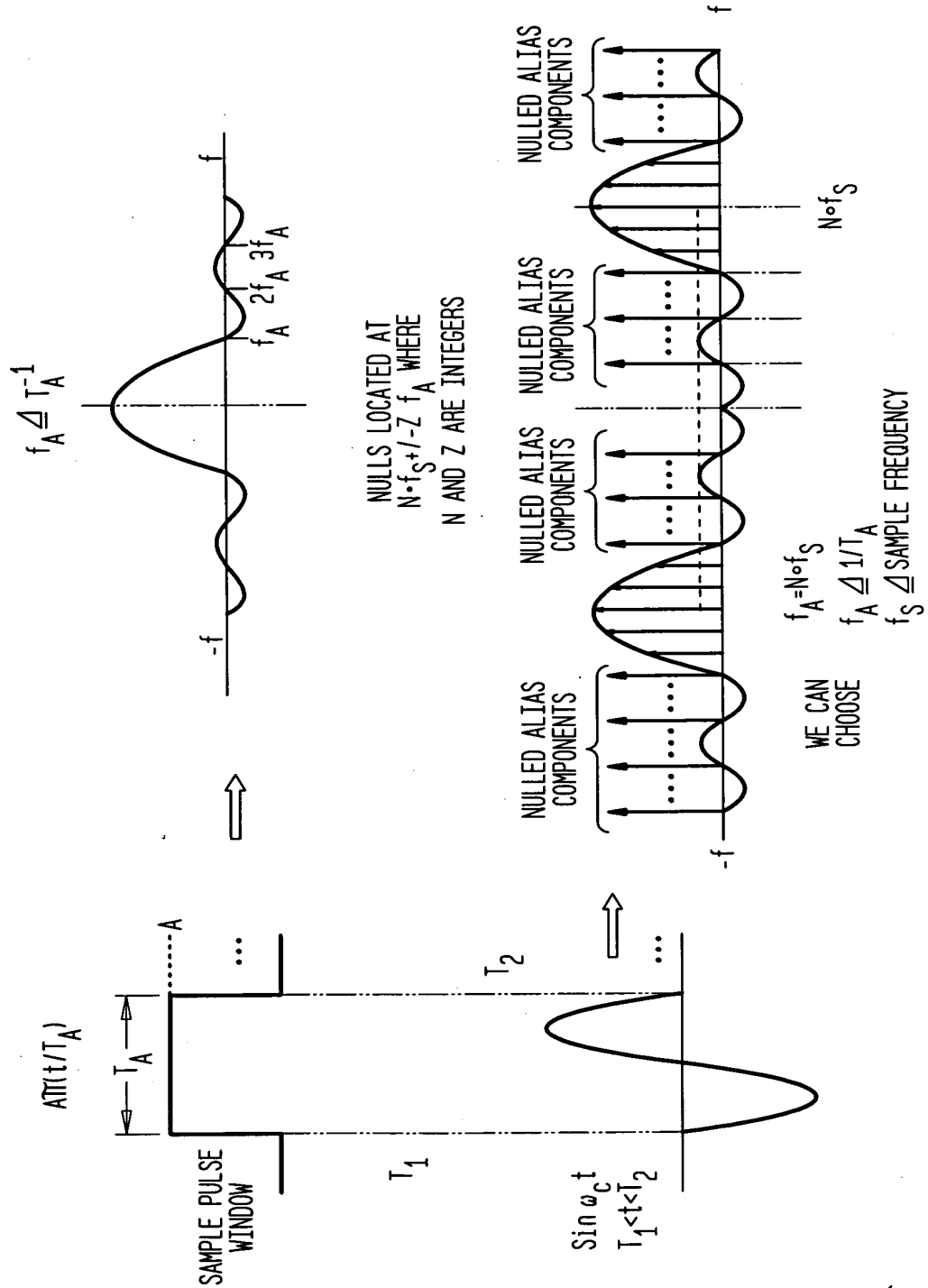
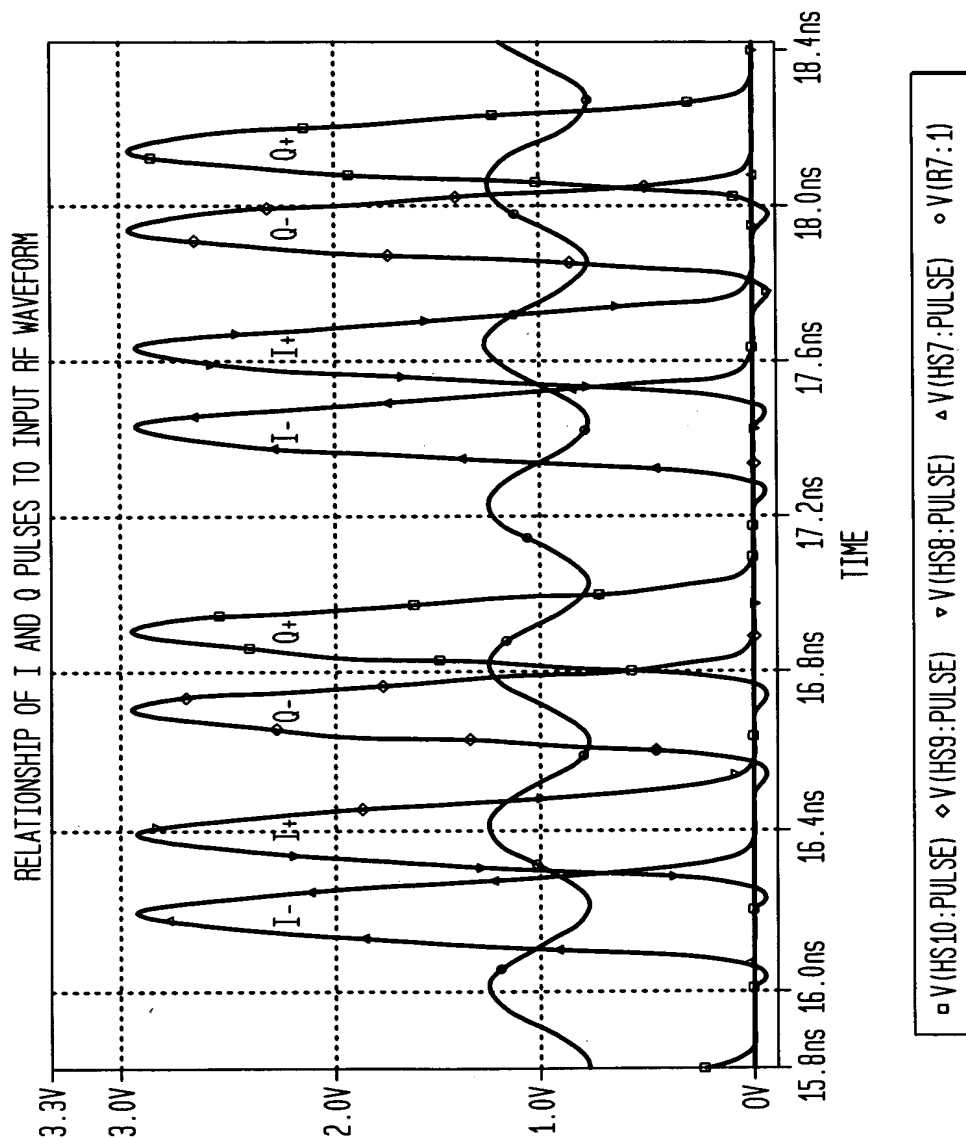


FIG. 180



**FIG. 181**

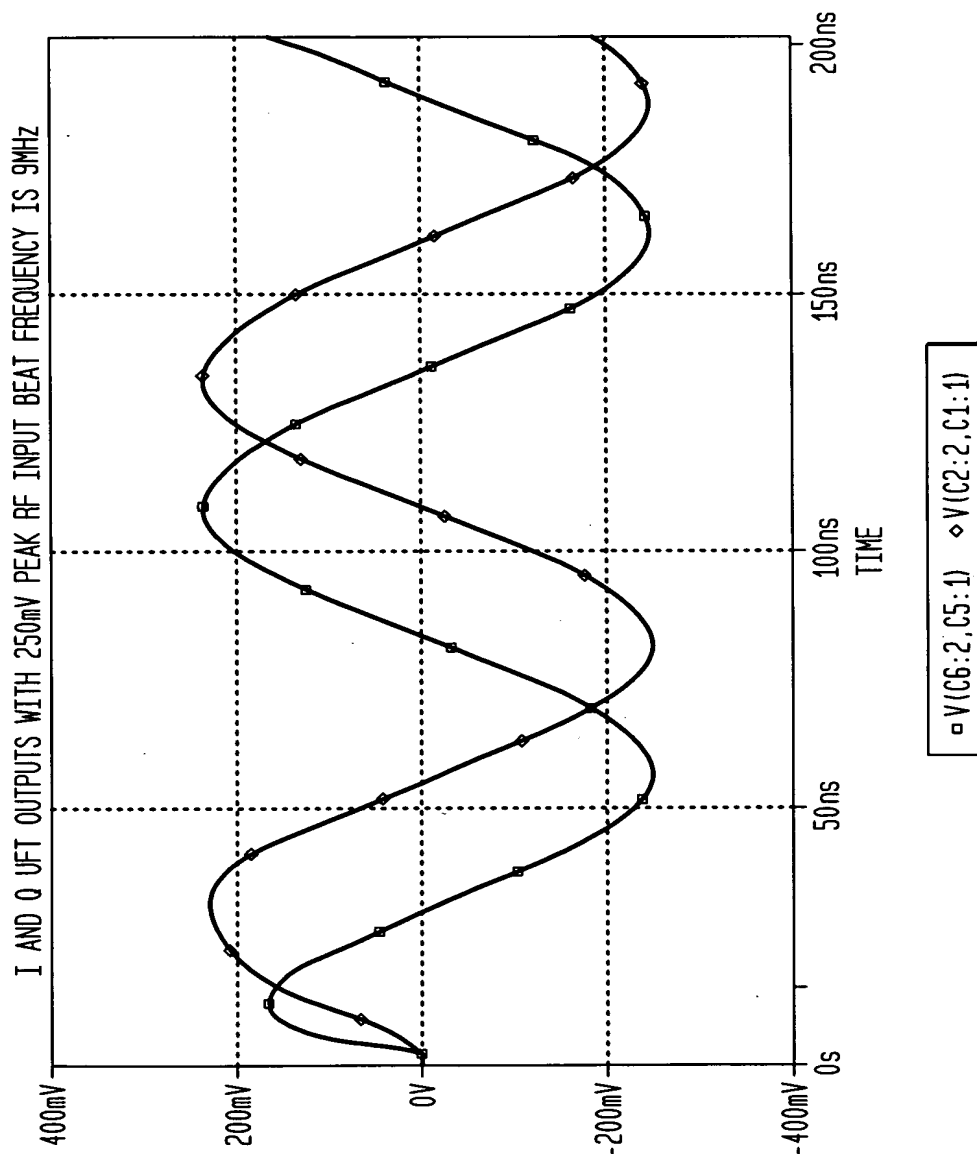
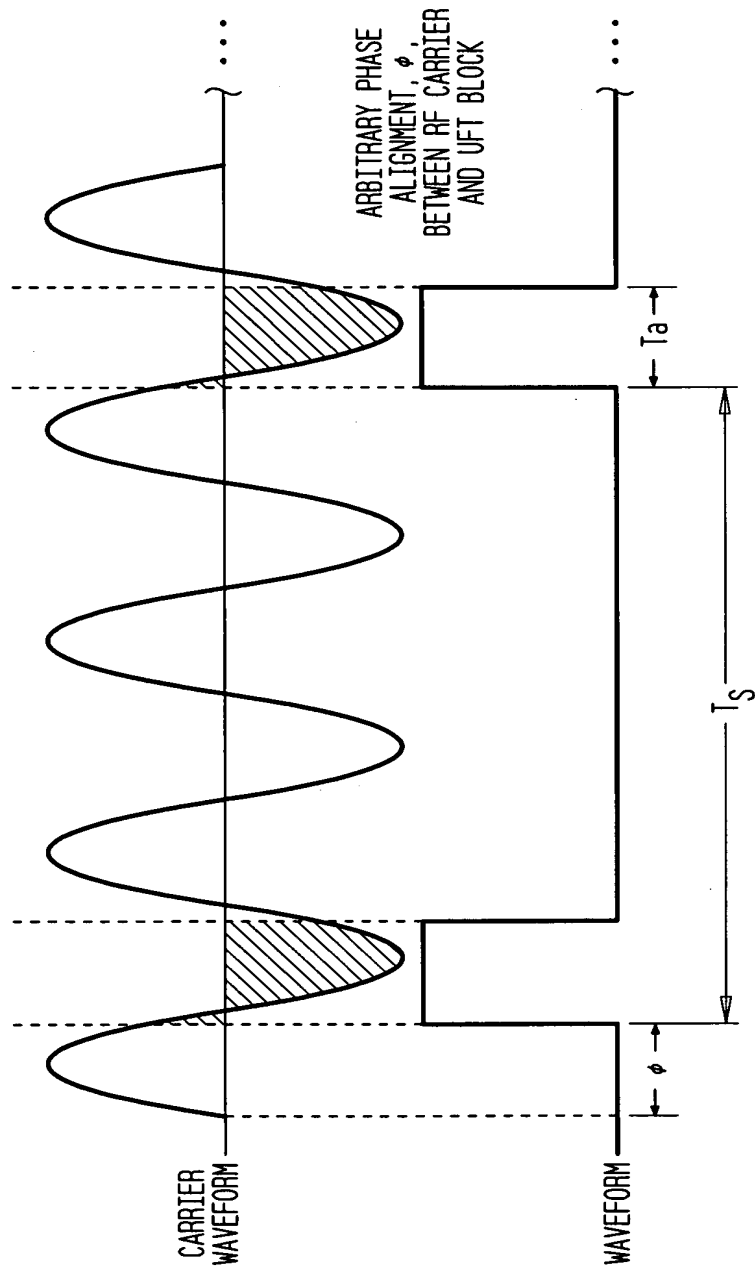
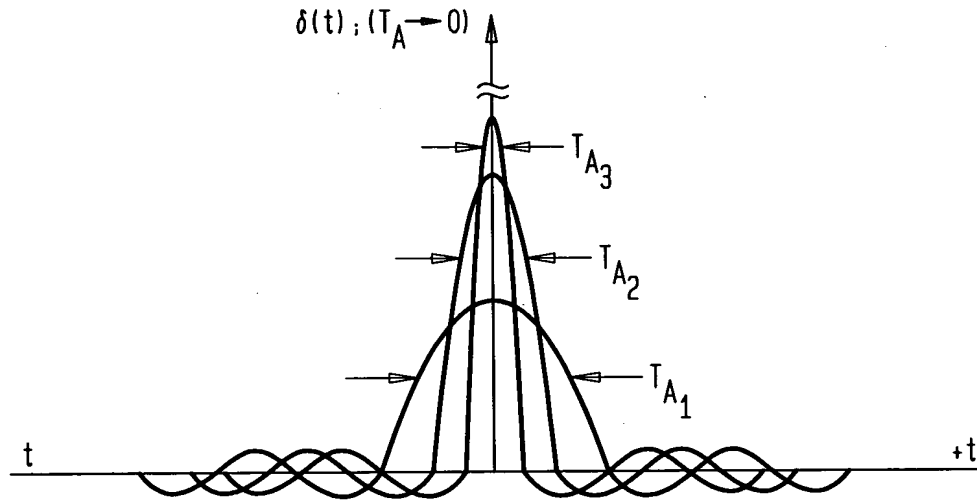


FIG. 182



**FIG. 183**



**FIG. 184**

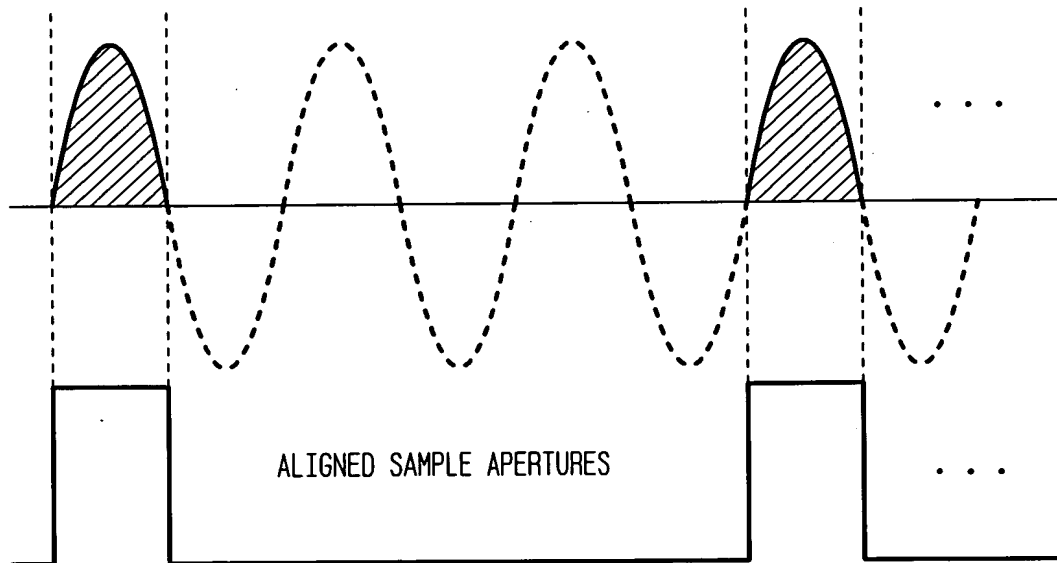


FIG. 185

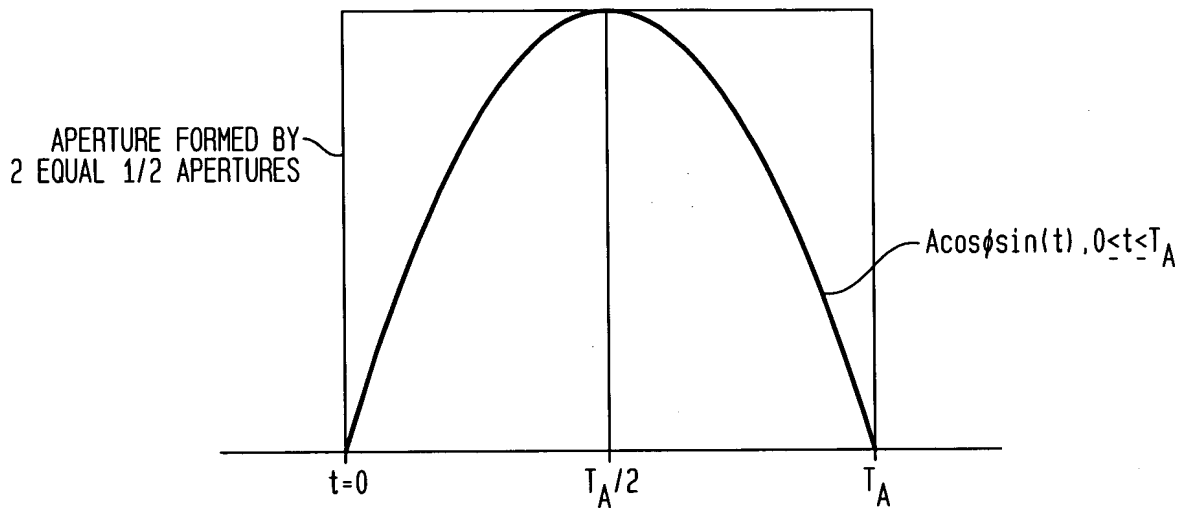
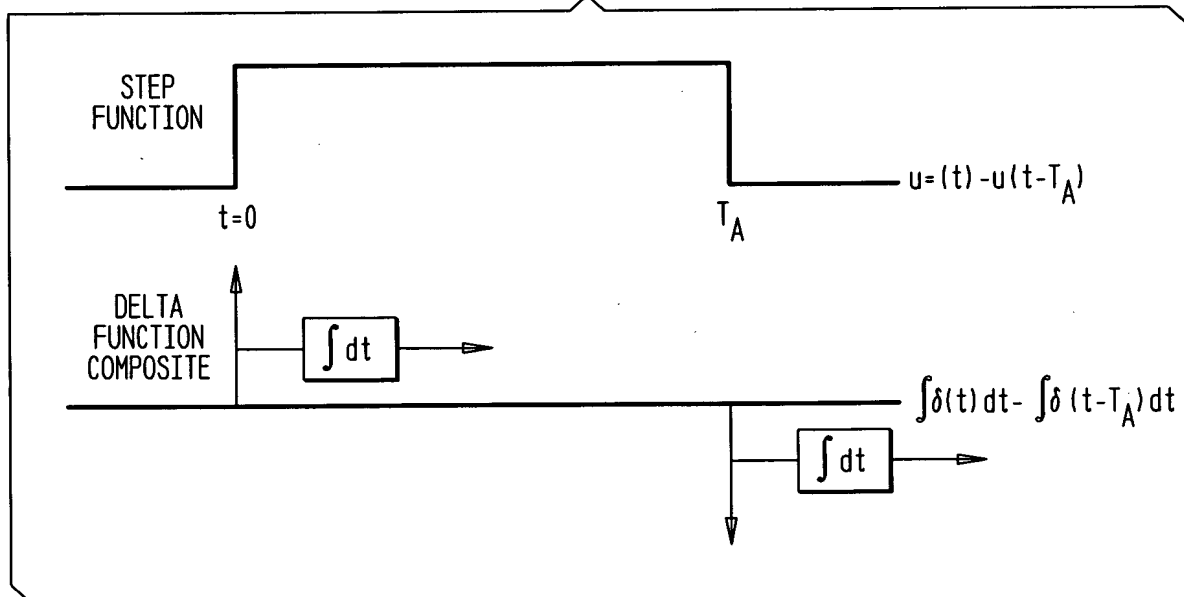
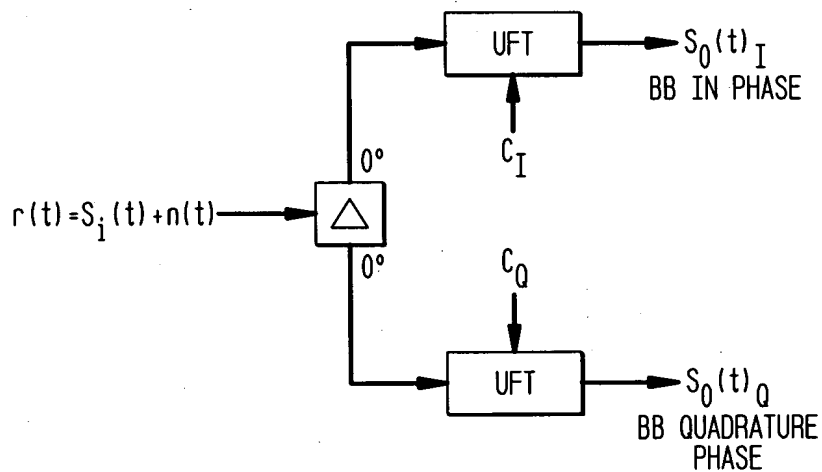


FIG. 186



**FIG. 187**



**FIG. 188**

$$C_I(t) = \sum_{m=-\infty}^{\infty} \delta(t - mT_S) * p_c(t) = \sum_{m=-\infty}^{\infty} p(t - mT_S) \quad 18802$$

$$C_I(t) = \sum_{m=-\infty}^{\infty} (u(t) - u(t - T_A)) * \delta(t - mT_S) \quad 18804$$

$$C_Q(t) = \sum_{m=-\infty}^{\infty} (u[t - T_A/2] - u[t - 3T_A/2]) * \delta(t - (mT_S + T_A/2)) \quad 18806$$

**FIG. 189**

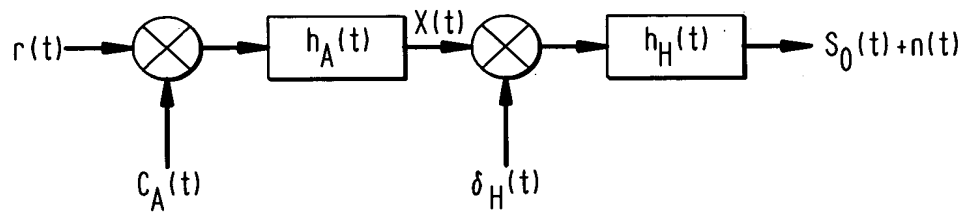


FIG. 190

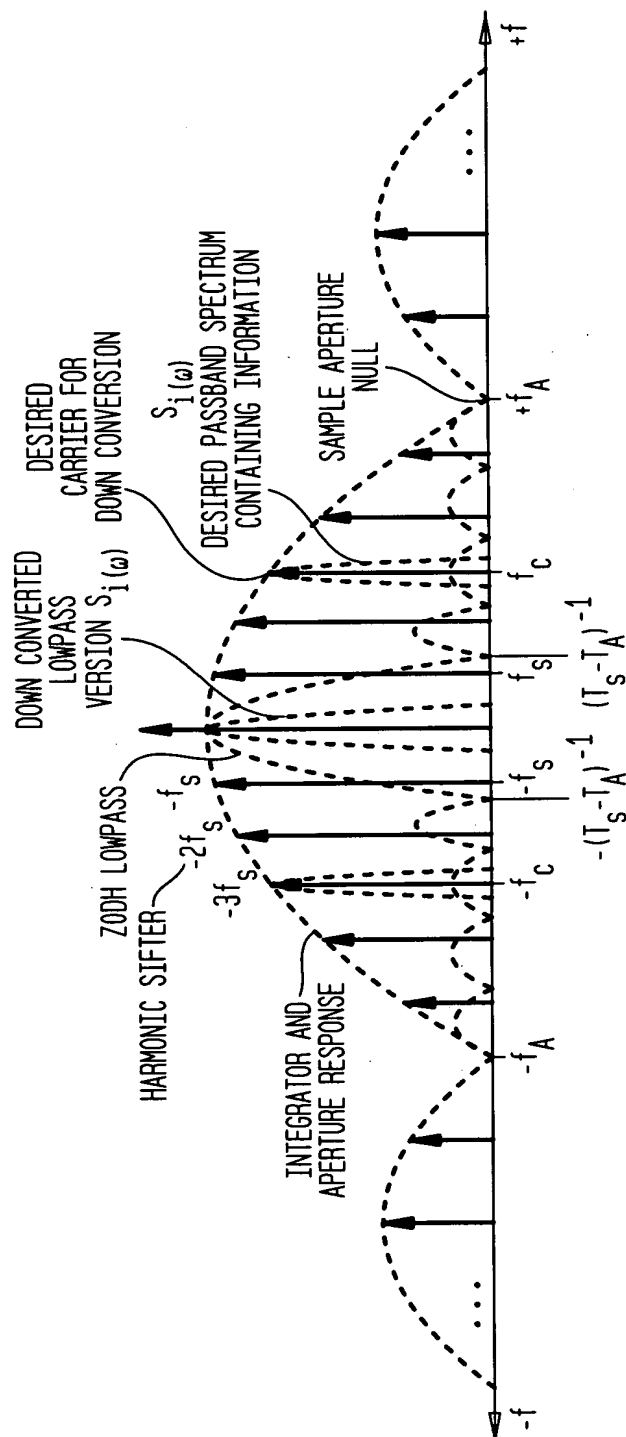


FIG. 191

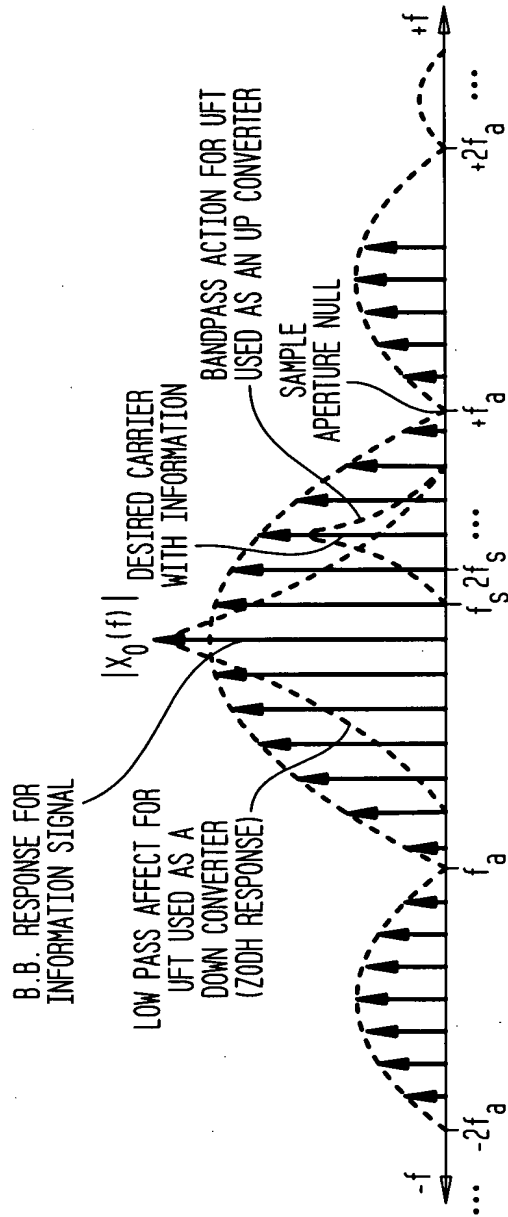
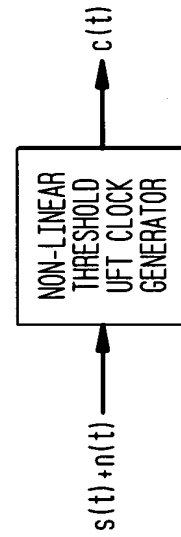
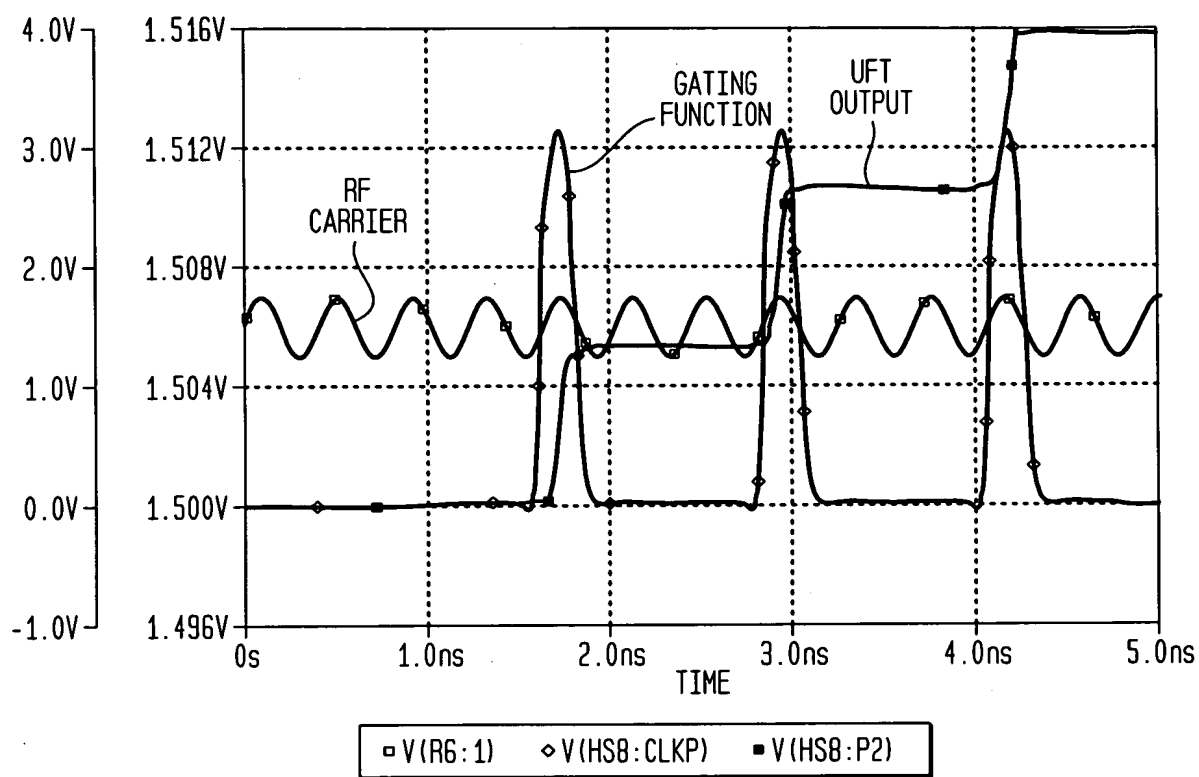


FIG. 192



**FIG. 193**



**FIG. 194**

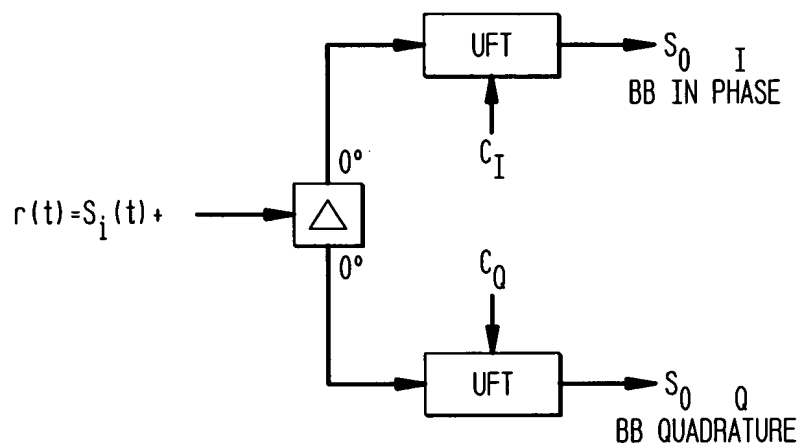


FIG. 195

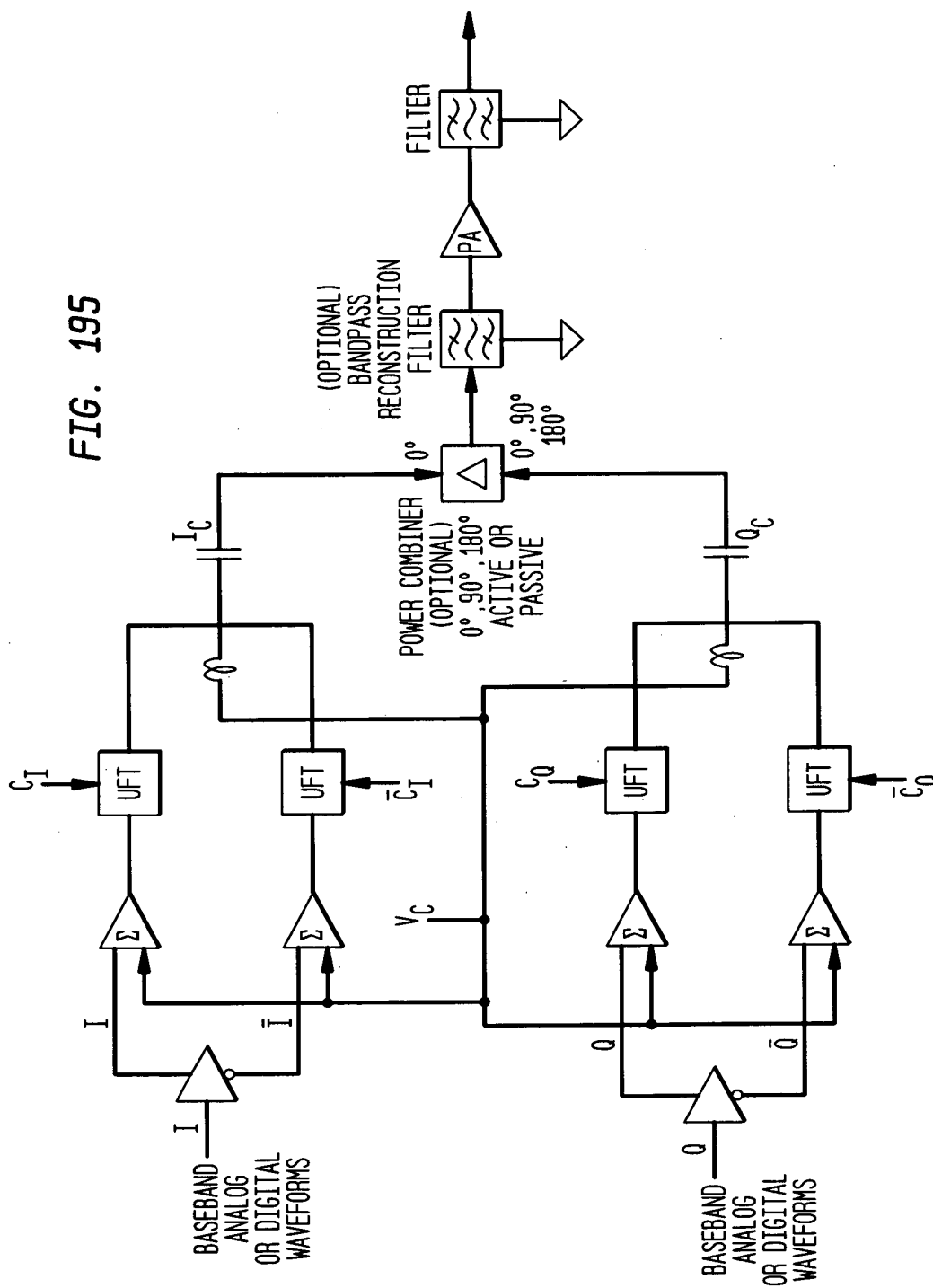
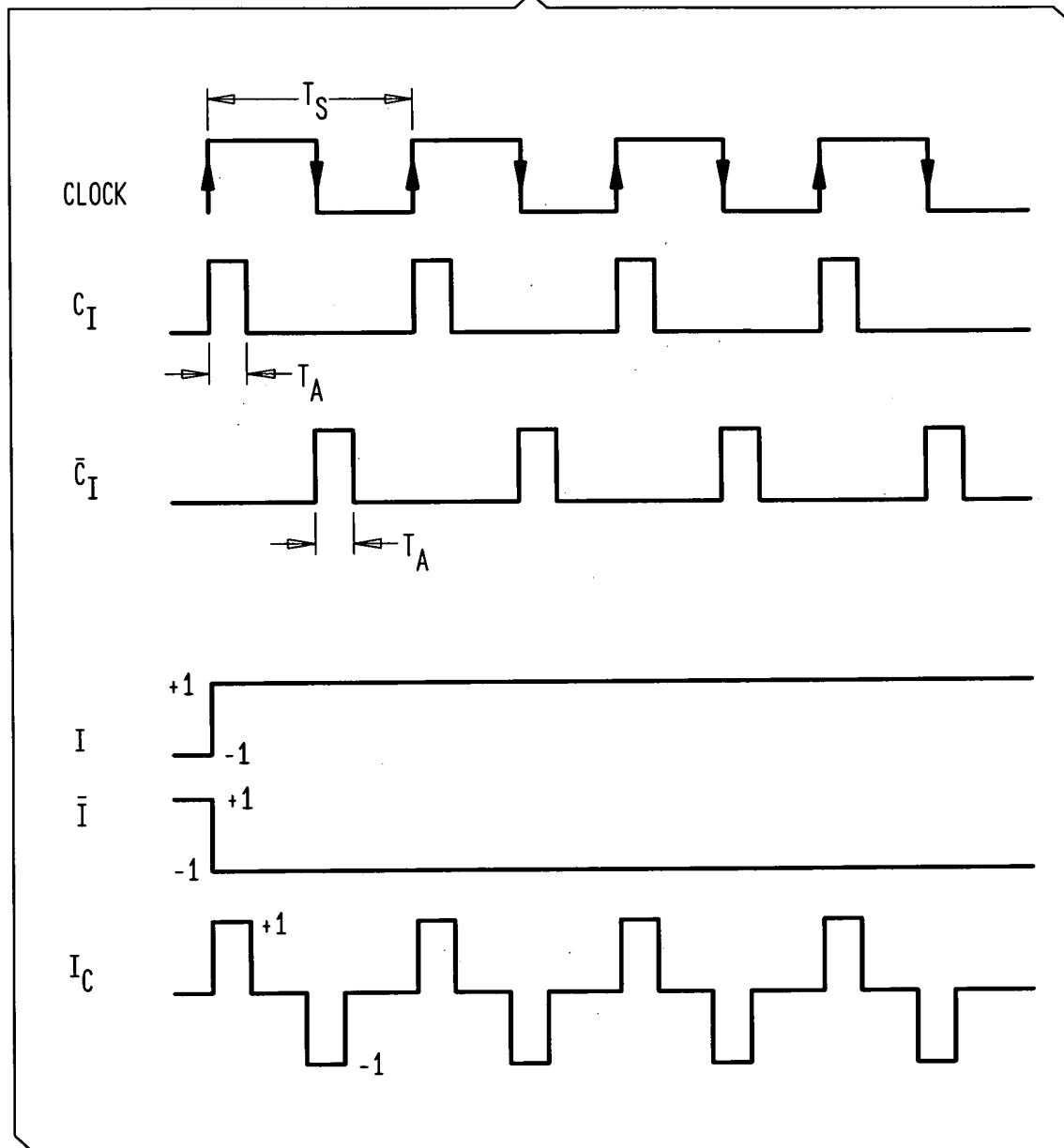
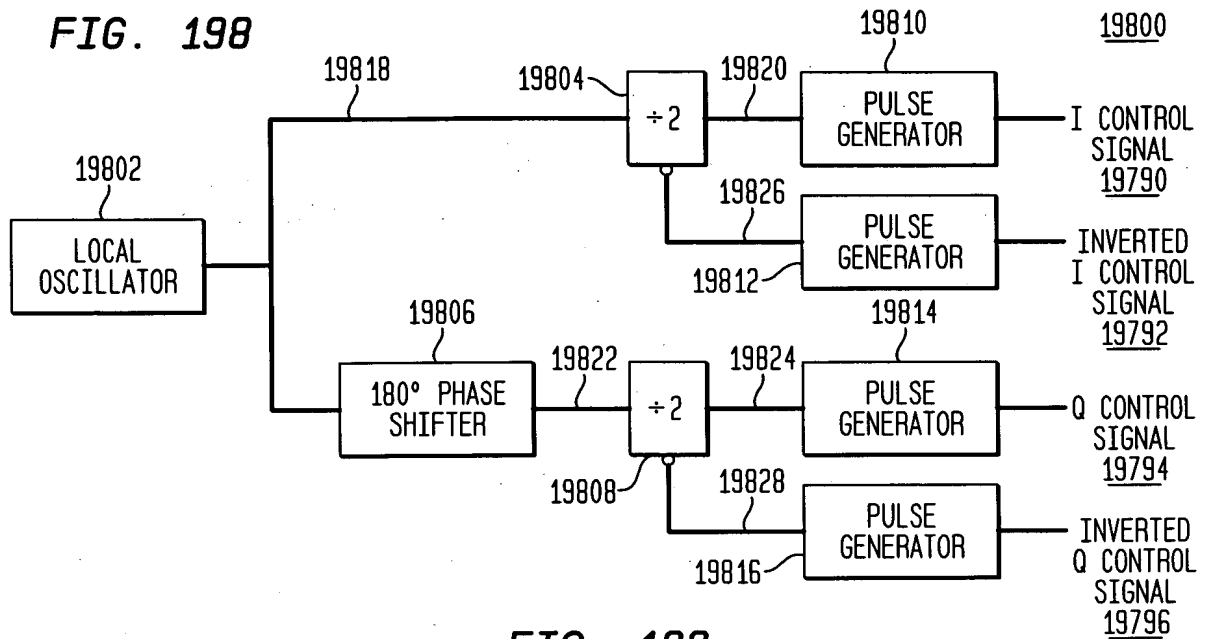


FIG. 196





**FIG. 198**



**FIG. 199**

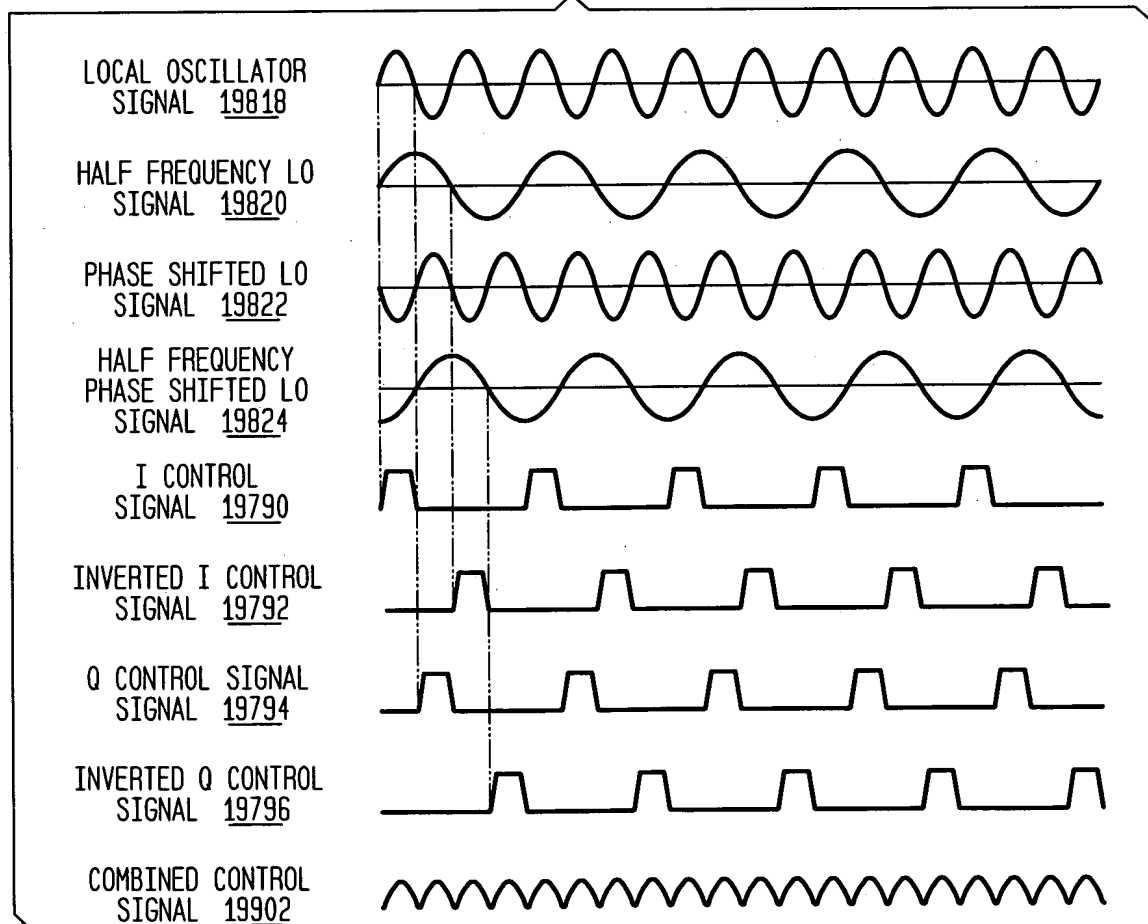


FIG. 200

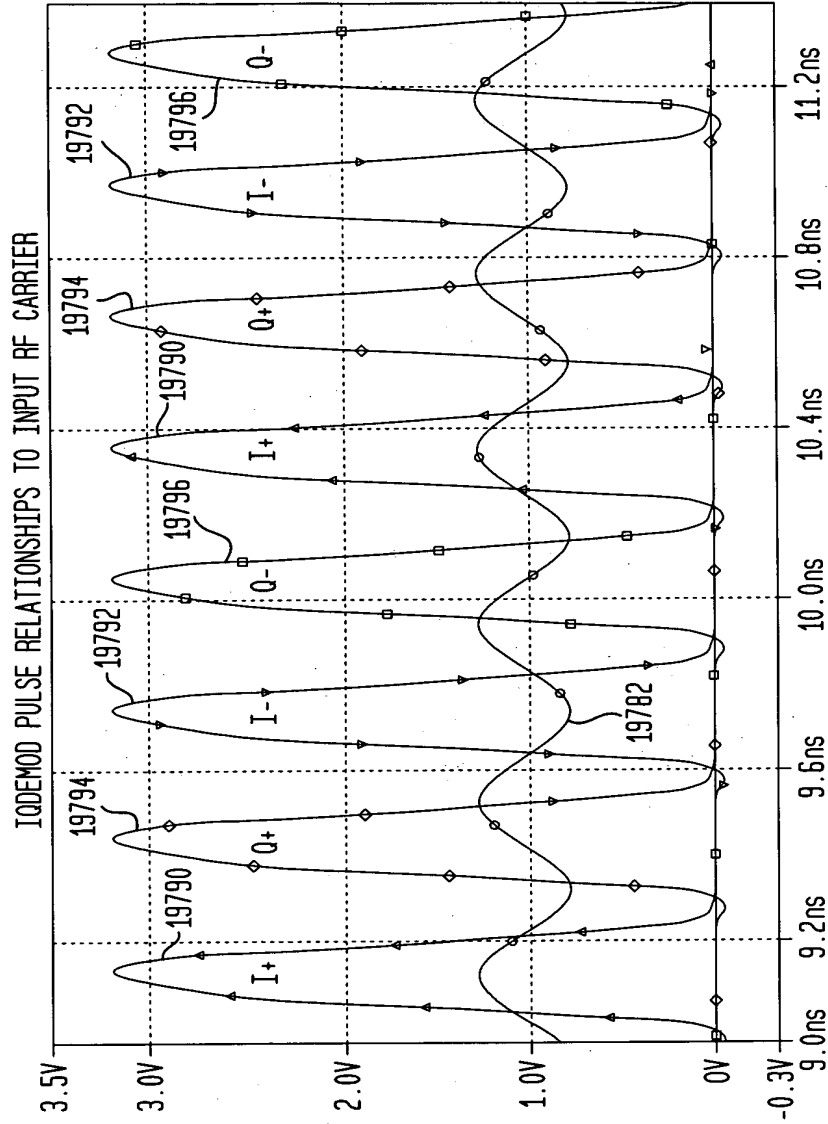
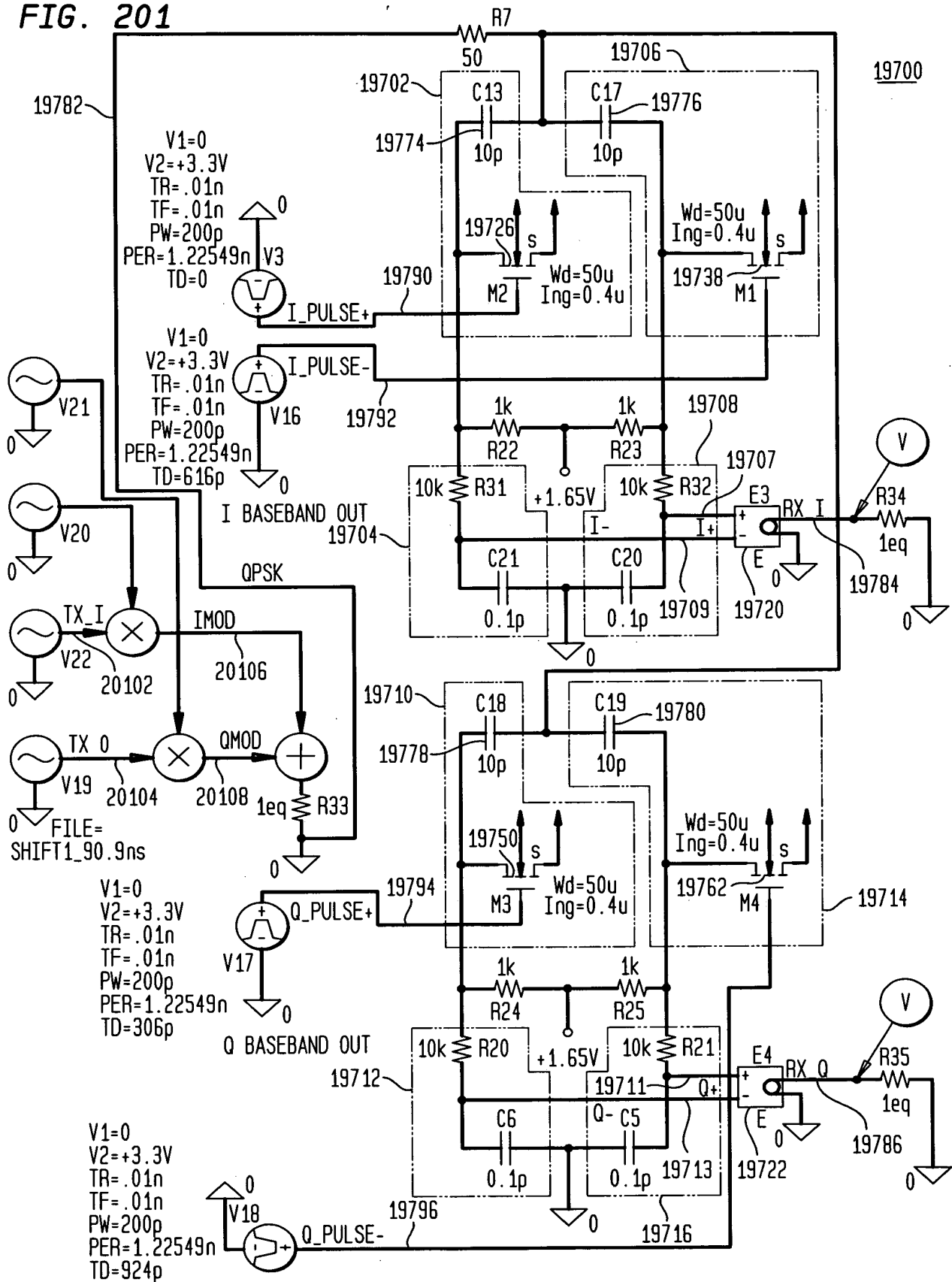
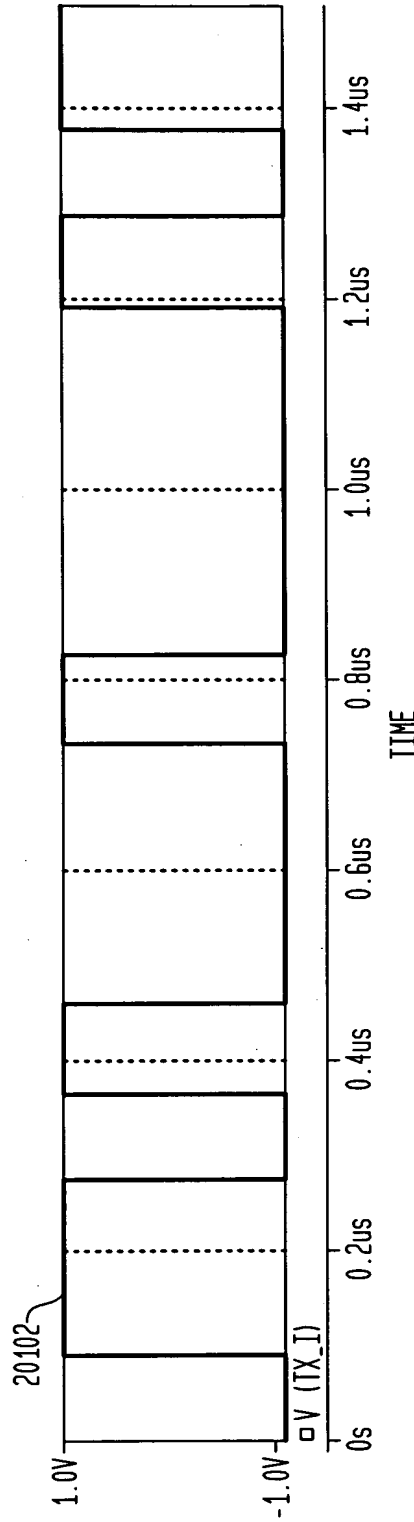


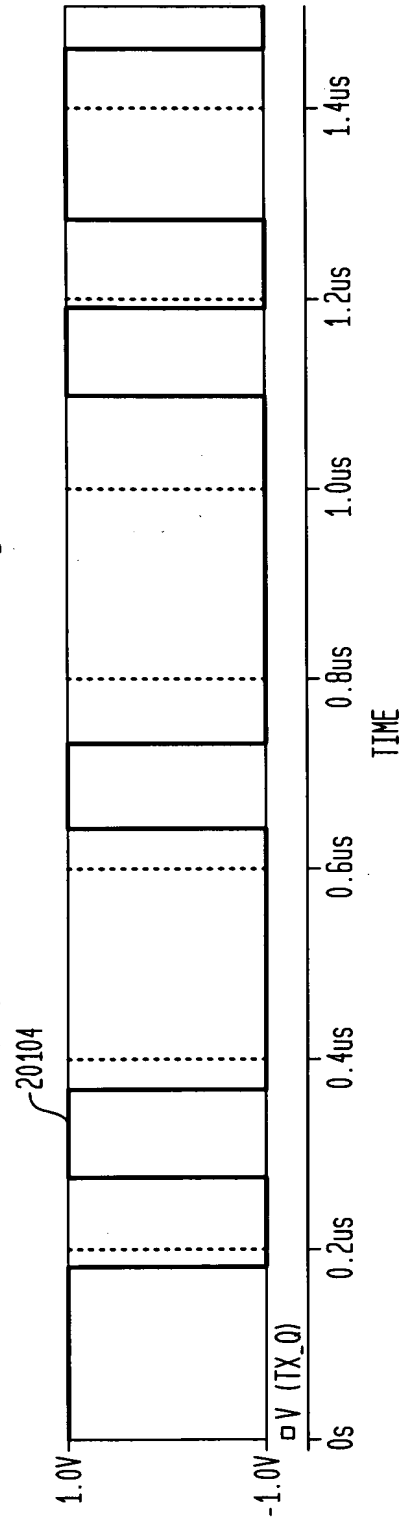
FIG. 201

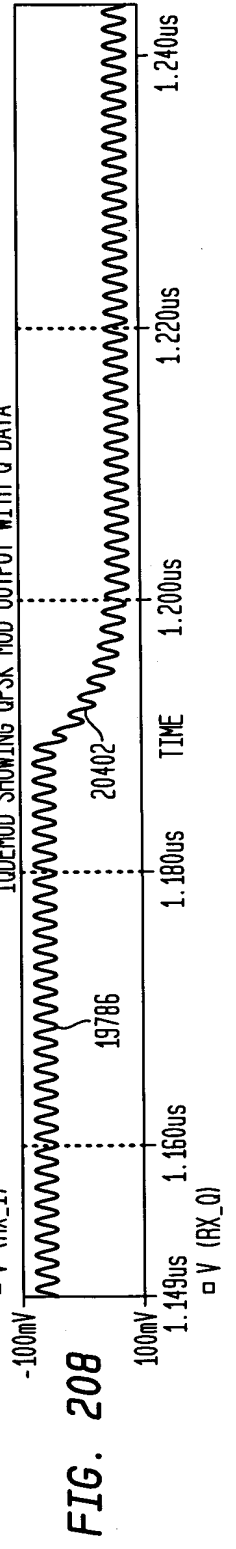
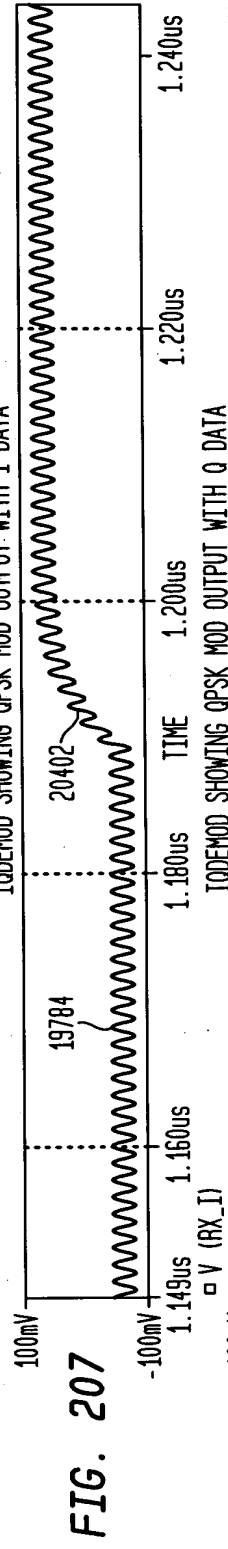
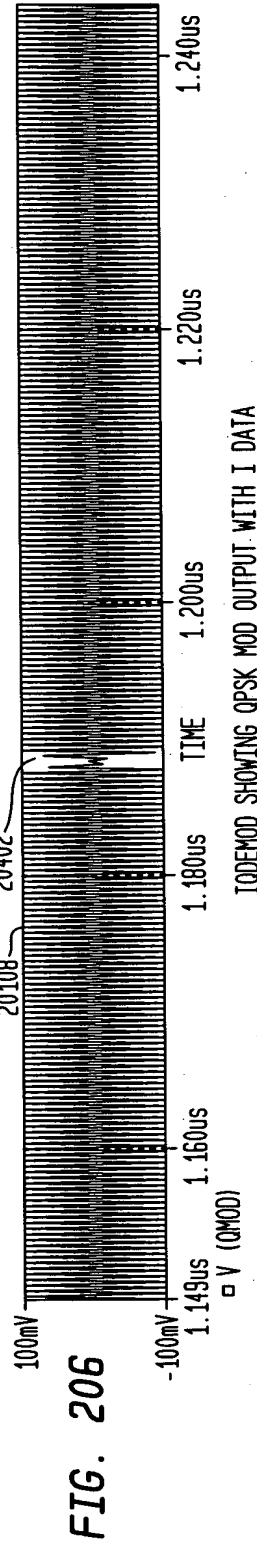
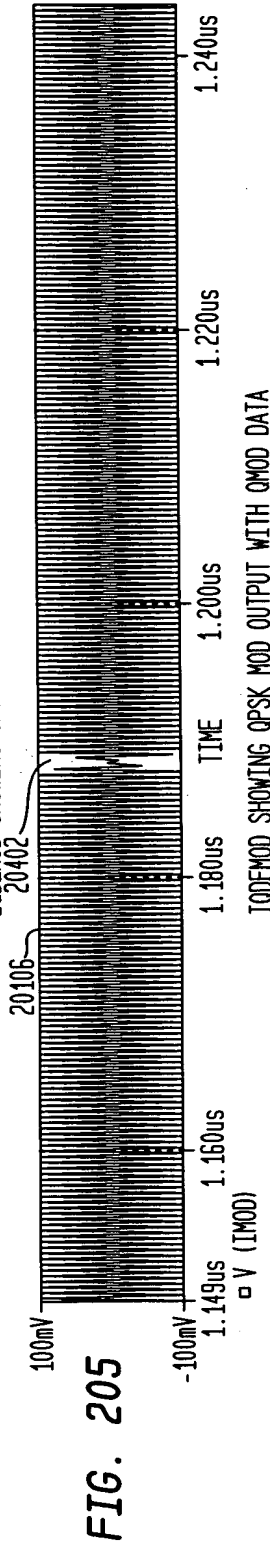
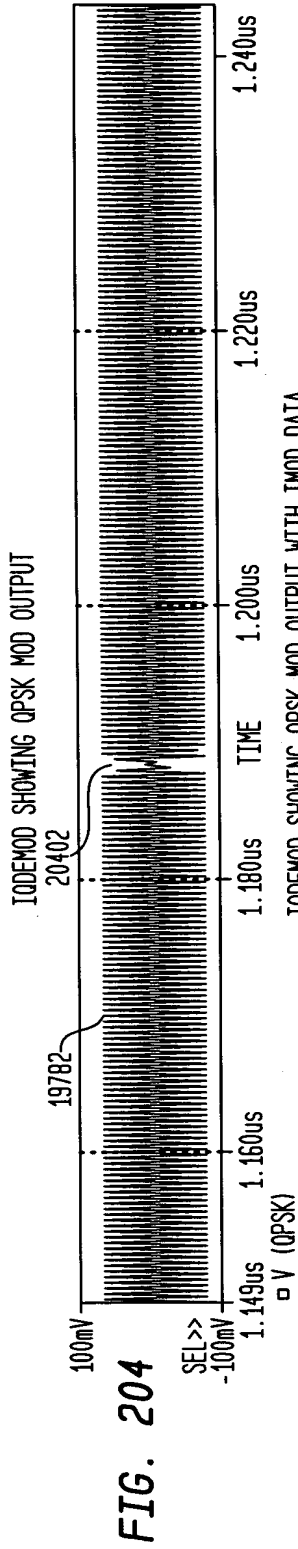


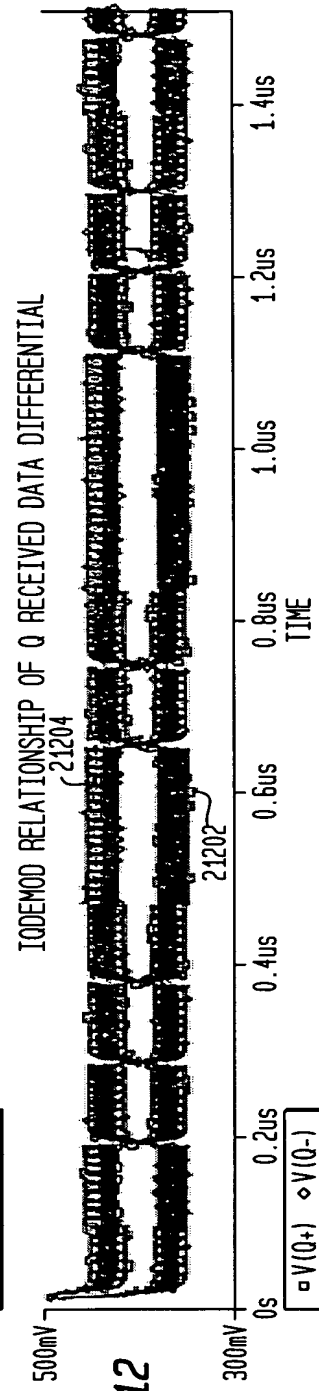
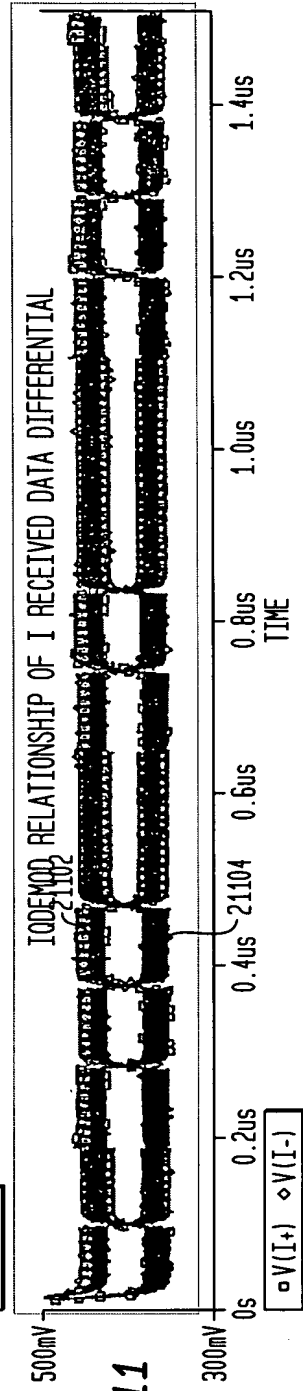
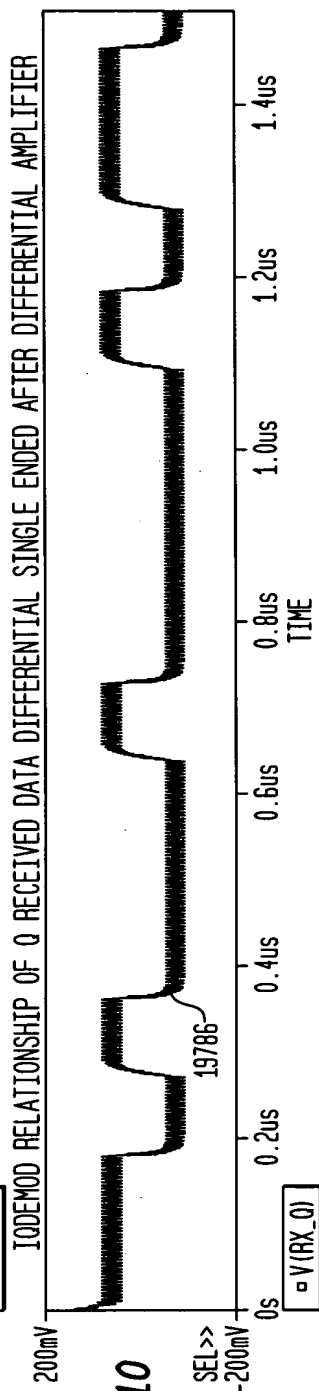
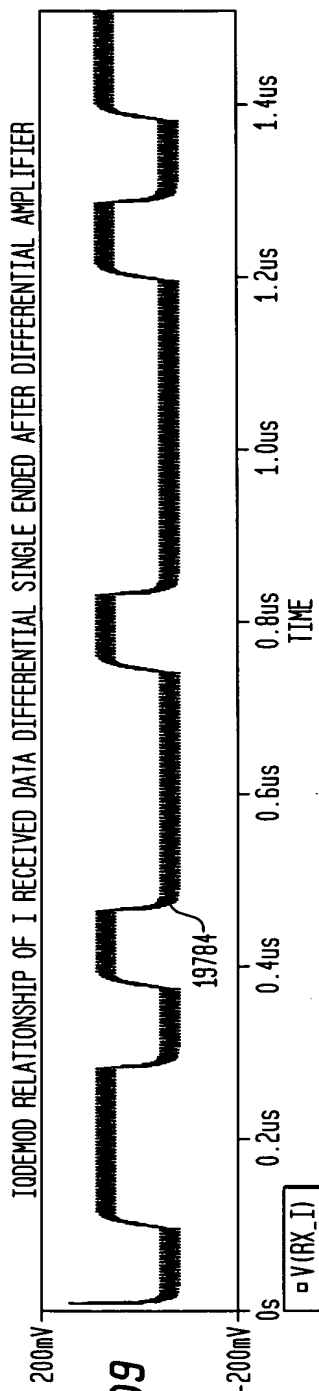
**FIG. 202**  
IODEMOD SHOWING TIME RELATIONSHIP OF TX\_I DATA



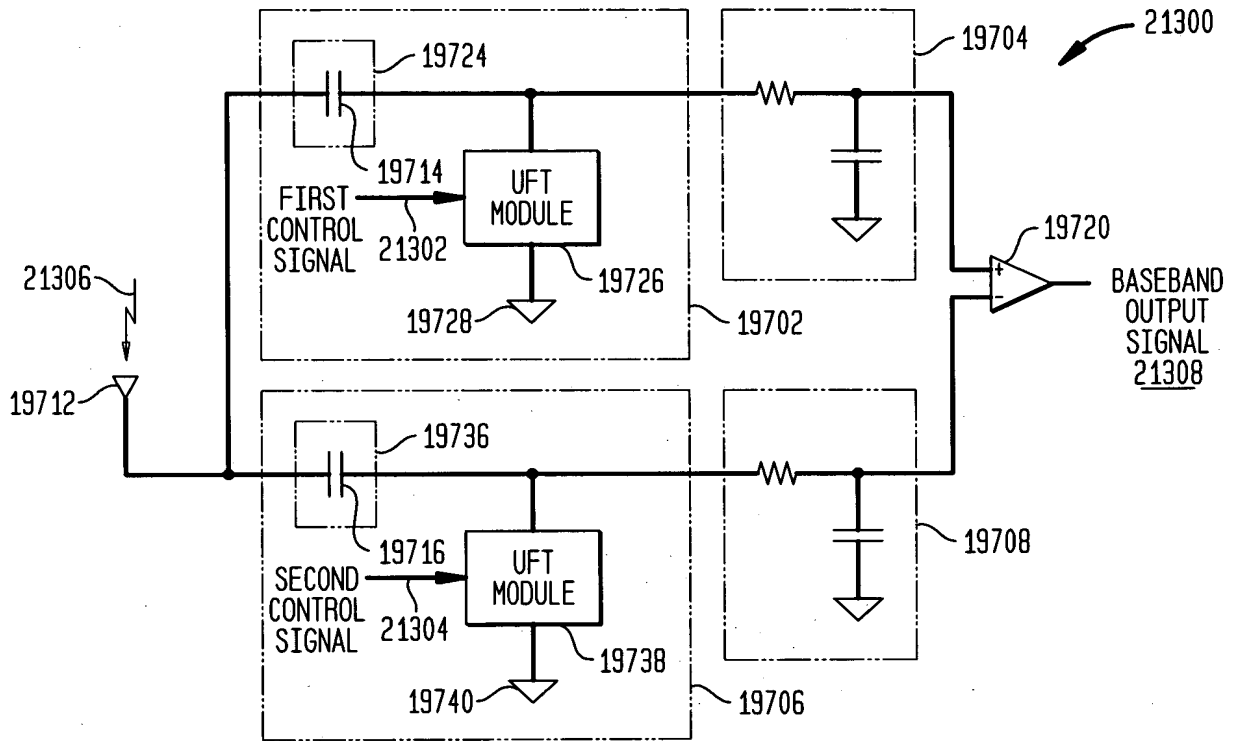
**FIG. 203**  
IODEMOD SHOWING TIME RELATIONSHIP OF TX\_Q DATA



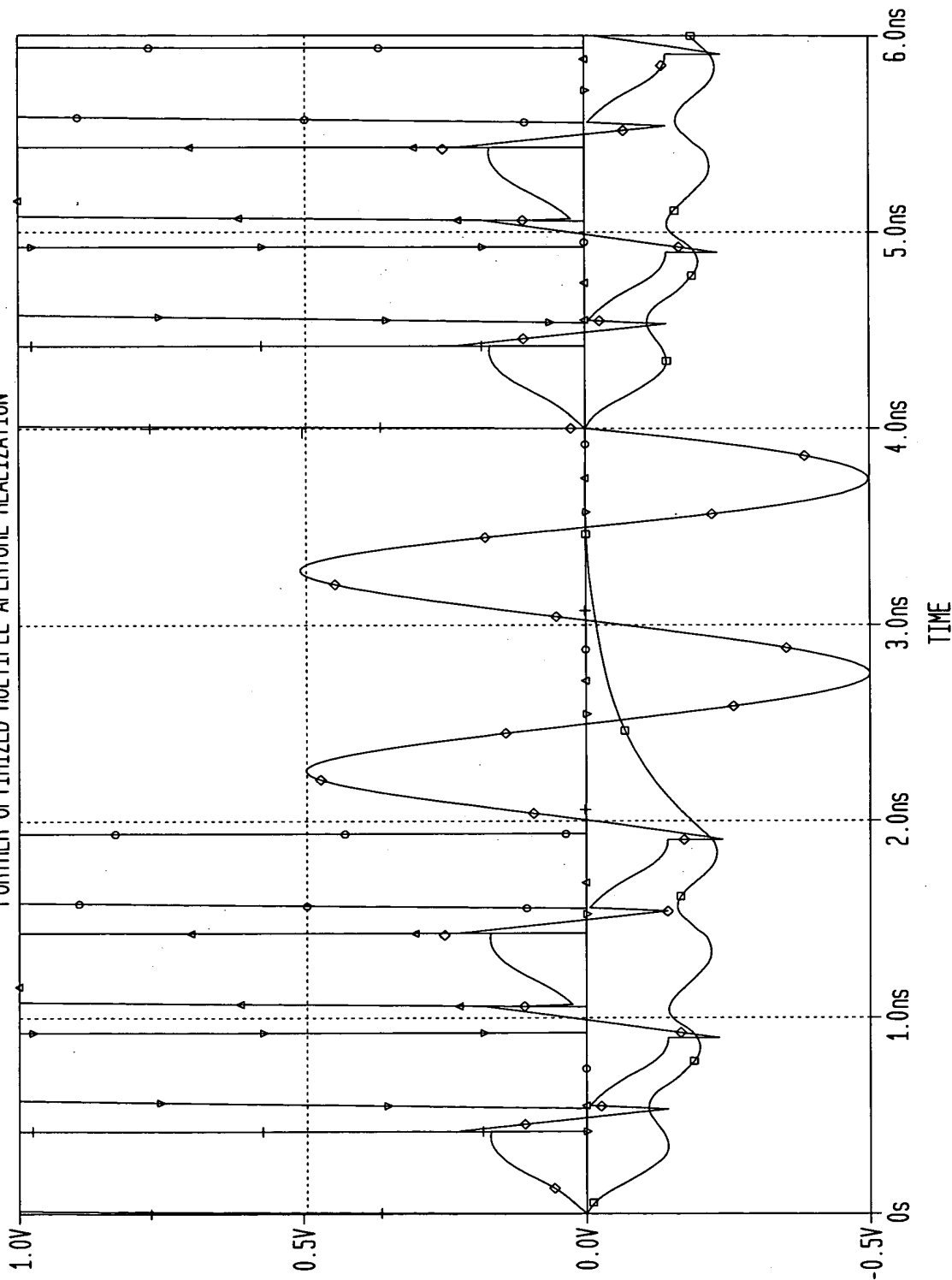




**FIG. 213**

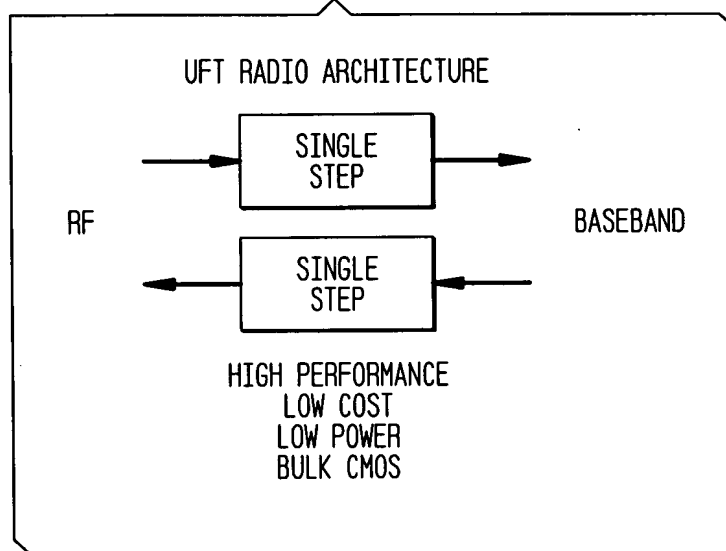


**FIG. 214**  
 FURTHER OPTIMIZED MULTIPLE APERTURE REALIZATION



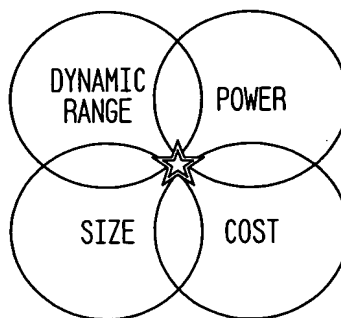
$\square V(\text{output\_final})$ 
 $\diamond V(\text{Input})$ 
 $\nabla V(\text{aperture\_2})$ 
 $\triangle V(\text{aperture\_3})$ 
 $\circ V(\text{aperture\_4})$ 
 $+ V(\text{aperture\_1})$

**FIG. 215**



**FIG. 216**

WIRELESS TRADE-OFF DESIGN CONCERNS



**FIG. 217**

NOISE FIGURE CALCULATIONS BASED ON RMS  
 VOLTAGE AND CURRENT NOISE SPECIFICATIONS

ENTER, THE VOLTAGE NOISE DENSITY,  $e_n$ , AND THE  
 CURRENT NOISE DENSITY,  $i_n$ , FOR THE AMPLIFIER CHOSEN:

$$e_n := 6 \cdot 10^{-9} \text{ V/sqrt(Hz)}$$

$$i_n := 1 \cdot 10^{-12} \text{ A/sqrt(Hz)}$$

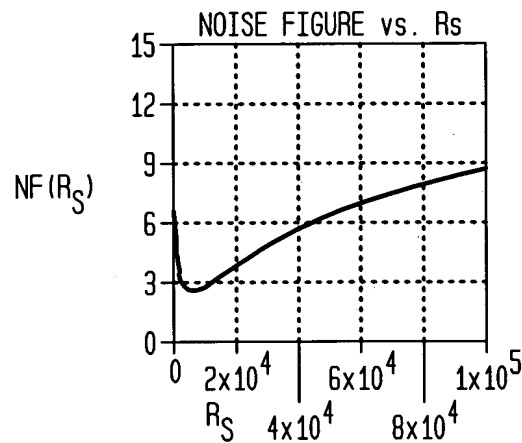
ENTER THE SOURCE RESISTANCE DRIVING THE AMPLIFIER:

$$K := 1.38 \cdot 10^{-23} \text{ J/K} \quad T := 290\text{K}$$

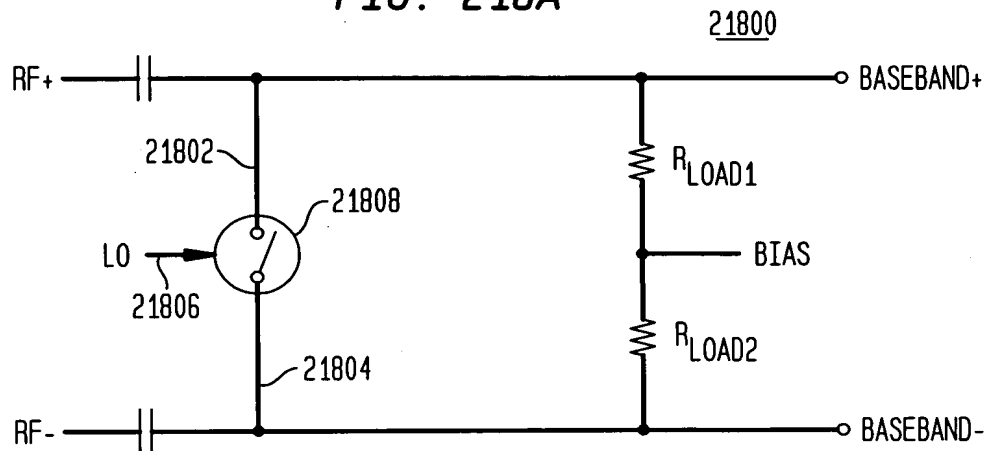
$$\text{PARALELL}(x, y) := \frac{x \cdot y}{x + y} \quad \text{NF}(R_S) := 20 \cdot \log \left( \sqrt{\frac{e_n^2 + 4 \cdot K \cdot T \cdot R_S + i_n^2 \cdot R_S^2}{4 \cdot K \cdot T \cdot R_S}} \right)$$

IF WE PLOT NOISE FIGURE VERSUS SOURCE RESISTANCE WE CAN GET  
 AN IDEA OF WHAT IS THE OPTIMUM SOURCE RESISTANCE.  
 IT IS NOT NECESSARILY THE LOWEST RESISTANCE!

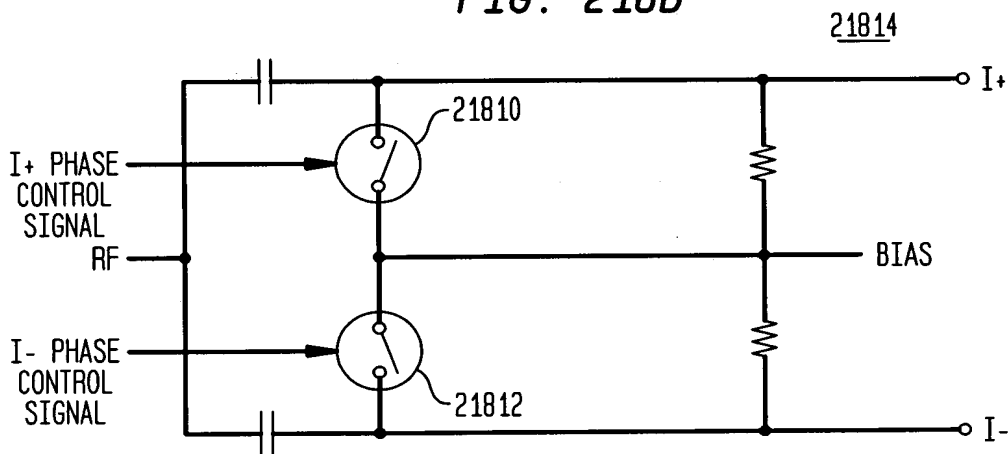
$$R_S := 100, 200, \dots, 100 \cdot 10^3$$



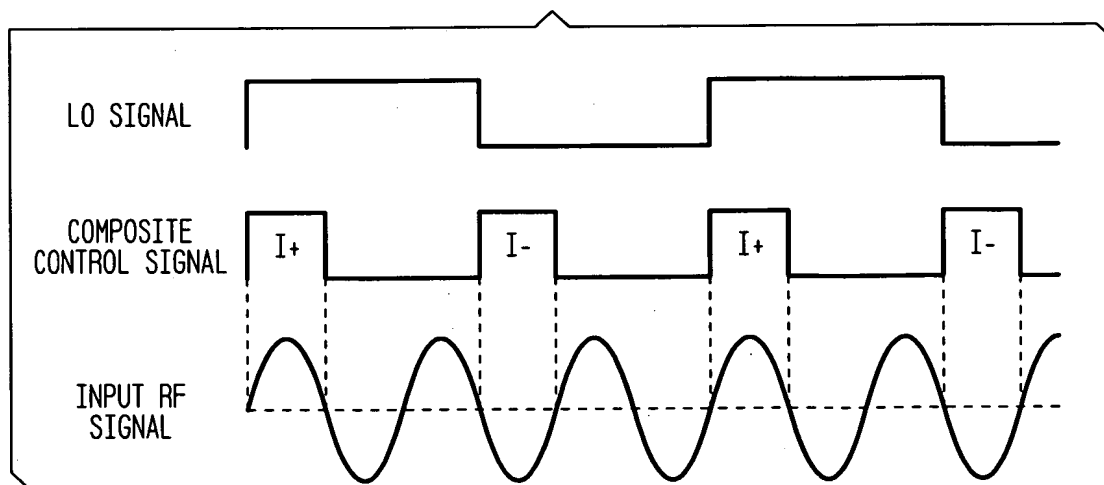
**FIG. 218A**



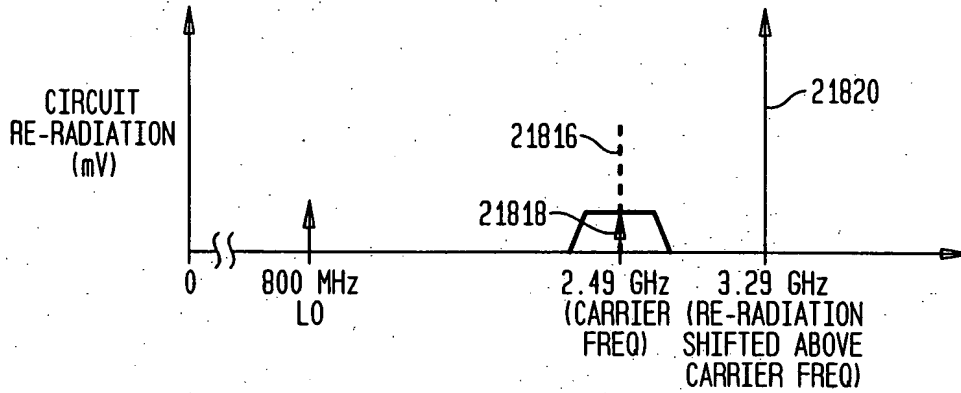
**FIG. 218B**



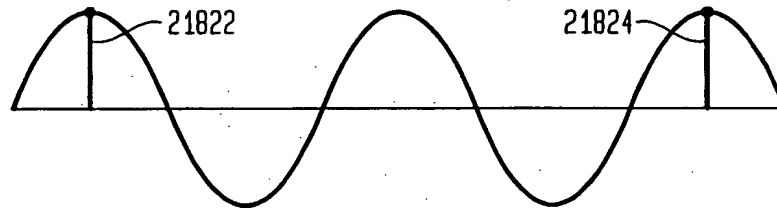
**FIG. 218C**



**FIG. 218D**



**FIG. 218F**



**FIG. 218G**

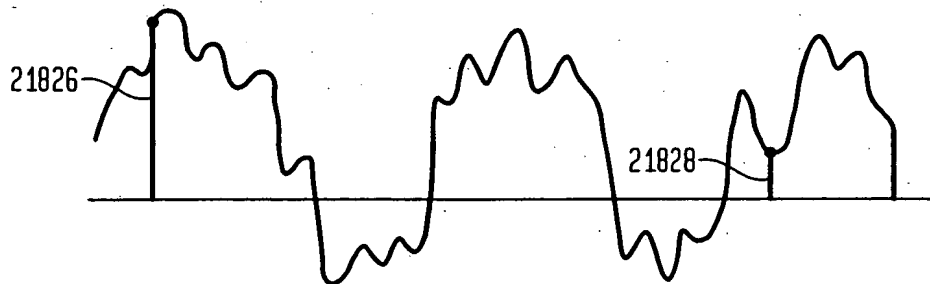
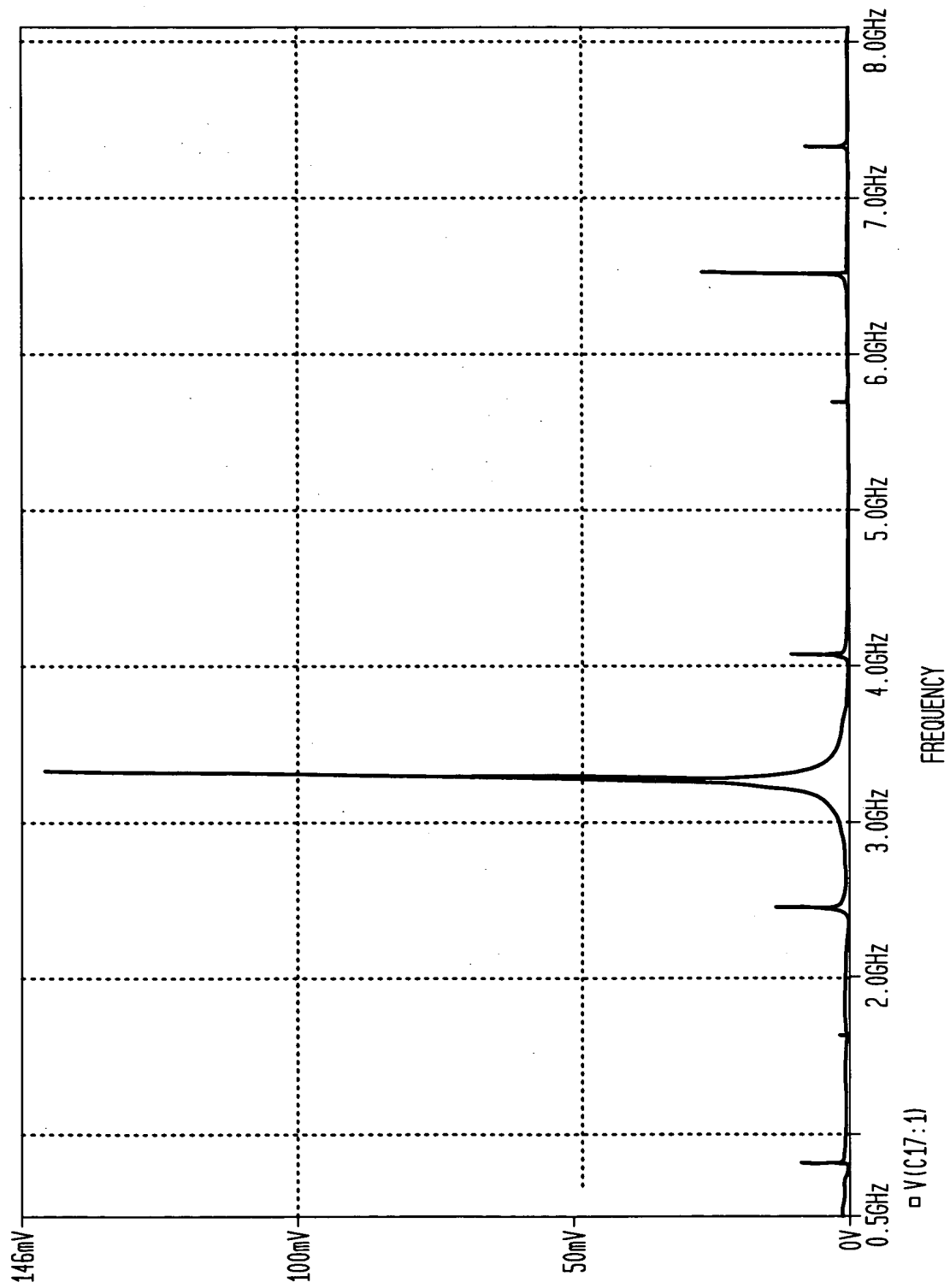
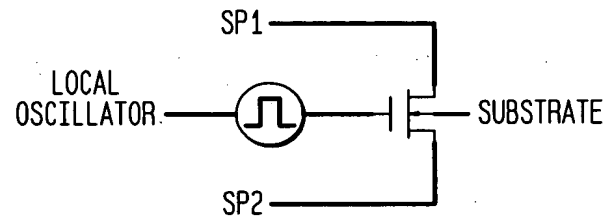


FIG. 218E



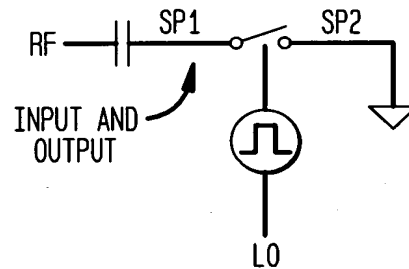
**FIG. 219**

IC CONCEPTUAL SCHEMATIC



**FIG. 220**

BASIC ARCHITECTURE



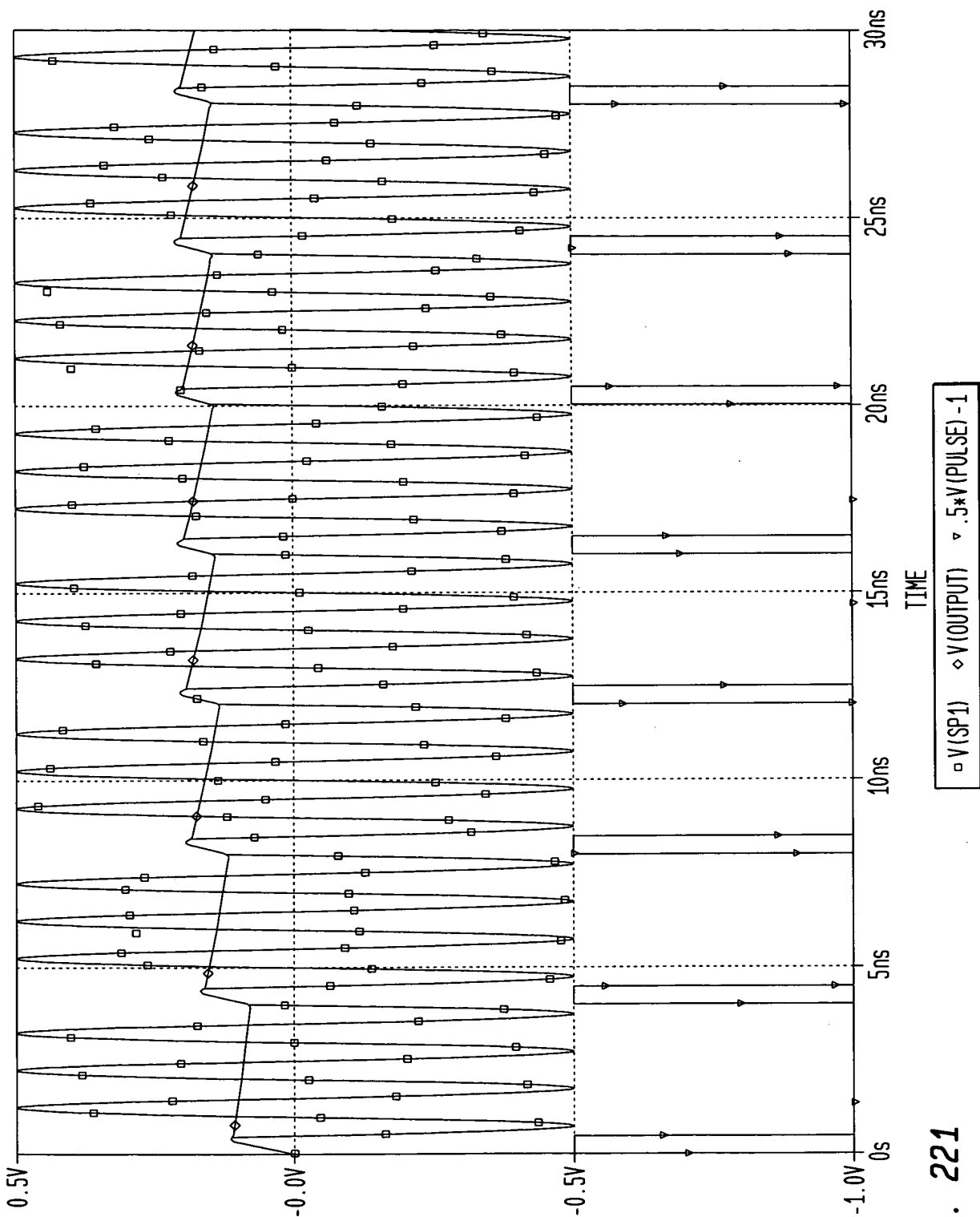


FIG. 221

**FIG. 222**

DC EQUATIONS

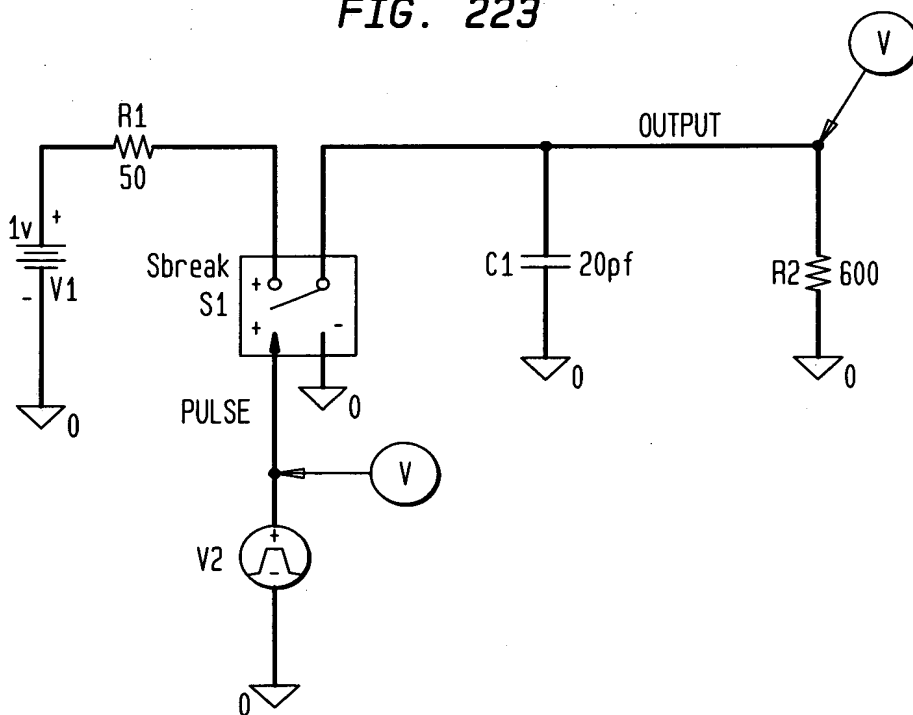
$$V_{in} = V \cdot \frac{R_{out}}{R_{in} + R_{out}}$$

$$V_c = V_{in} - (V_{in} - V_{init}) \cdot \exp\left(\frac{-t_c}{R_{in} \cdot C}\right)$$

$$V_d = V_c \cdot \exp\left(\frac{-t_d}{R_{out} \cdot C}\right)$$

DEFINITIONS: Rin - INPUT RESISTANCE  
 Rout - OUTPUT RESISTANCE  
 C - CAPACITOR  
 tc - CHARGE TIME OR APERTURE  
 td - DISCHARGE TIME OR LO PERIOD-tc  
 V - INPUT VOLTAGE  
 Vinit - INITIAL CAPACITOR VOLTAGE  
 Vc - FINAL CHARGE CAPACITOR VOLTAGE  
 Vd - FINAL DISCHARGE CAPACITOR VOLTAGE

**FIG. 223**



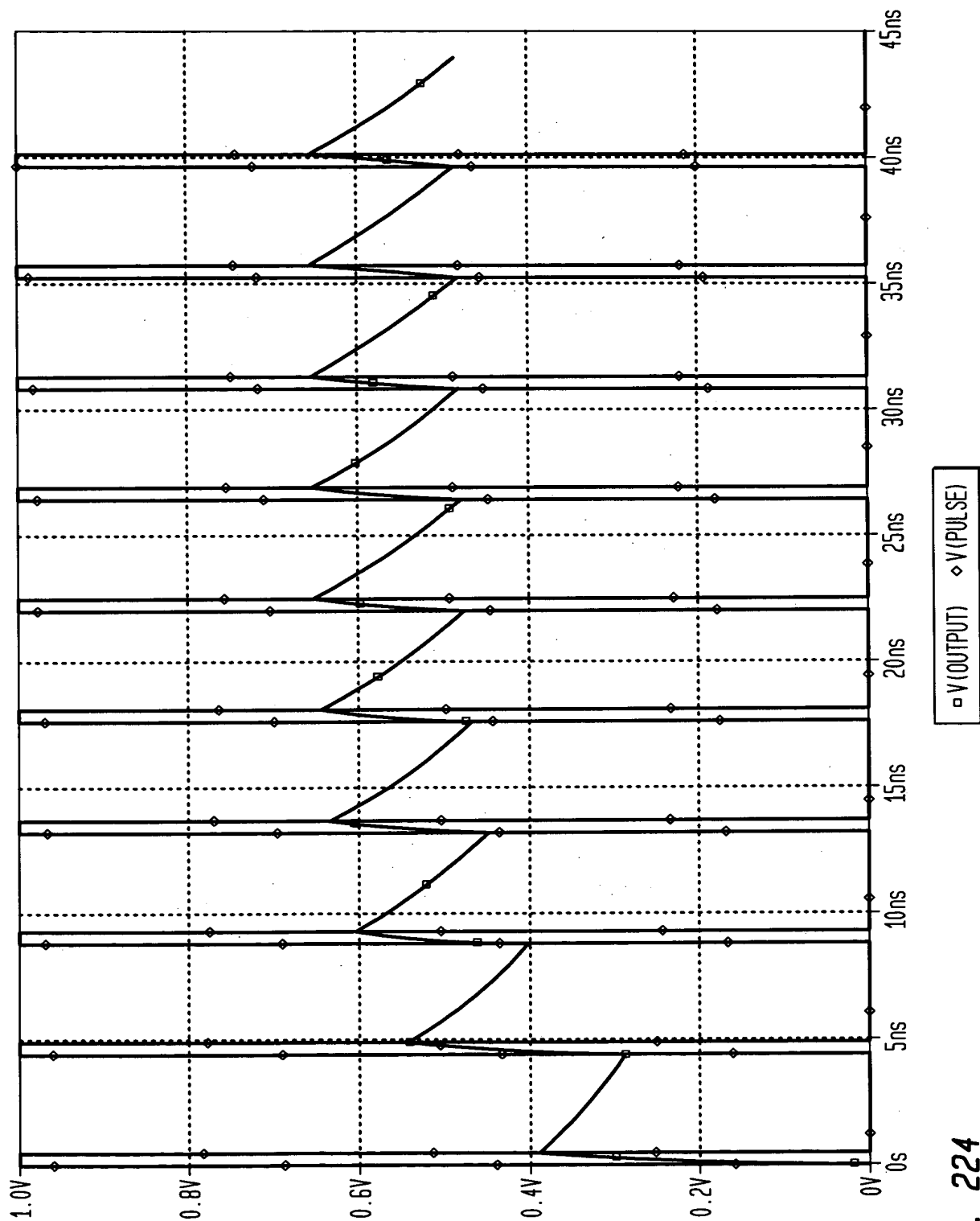
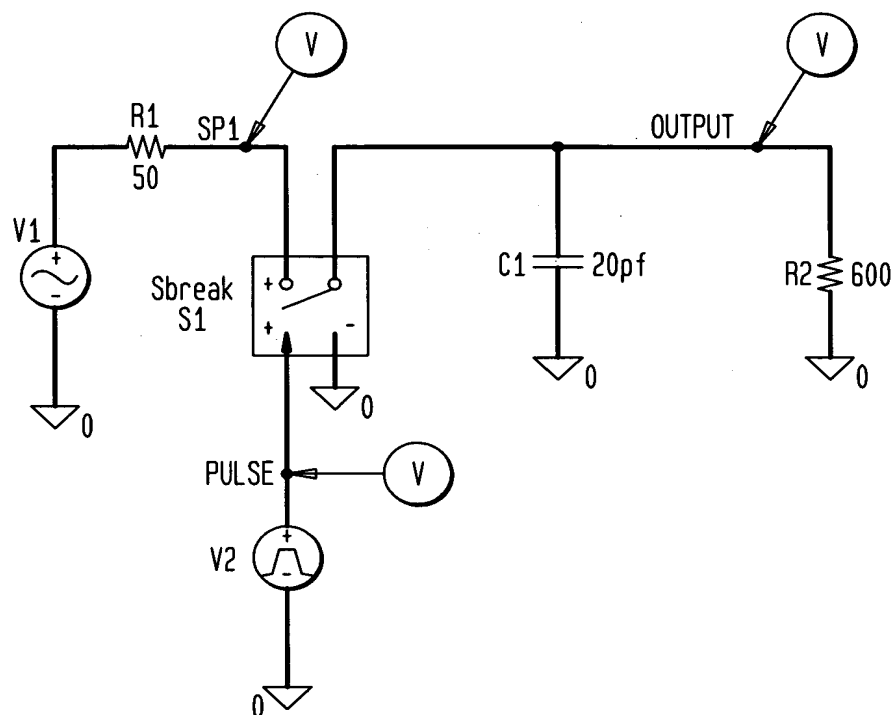
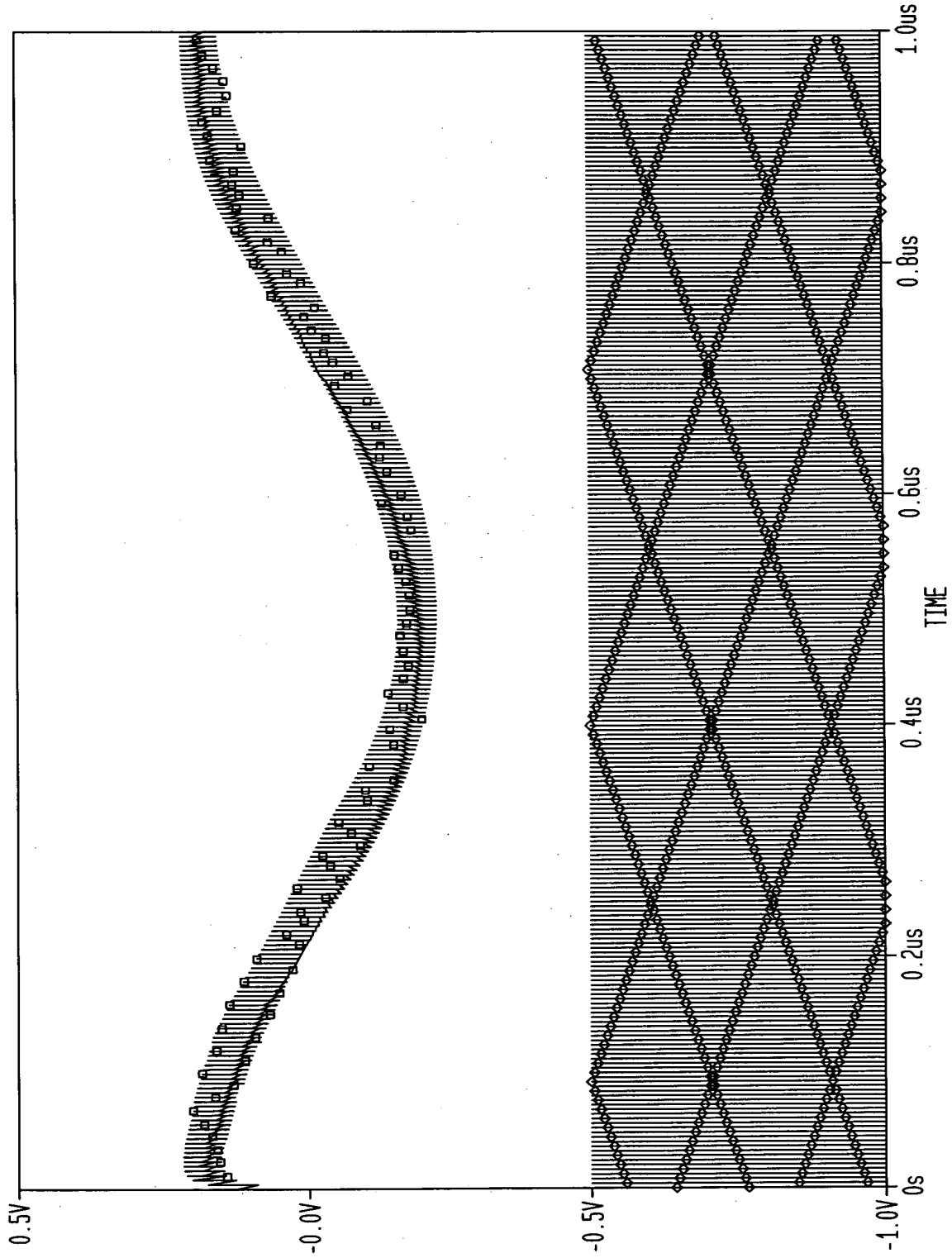


FIG. 224

FIG. 225





□ V(OUTPUT) ◊ .5\*V(PULSE)-1

FIG. 226

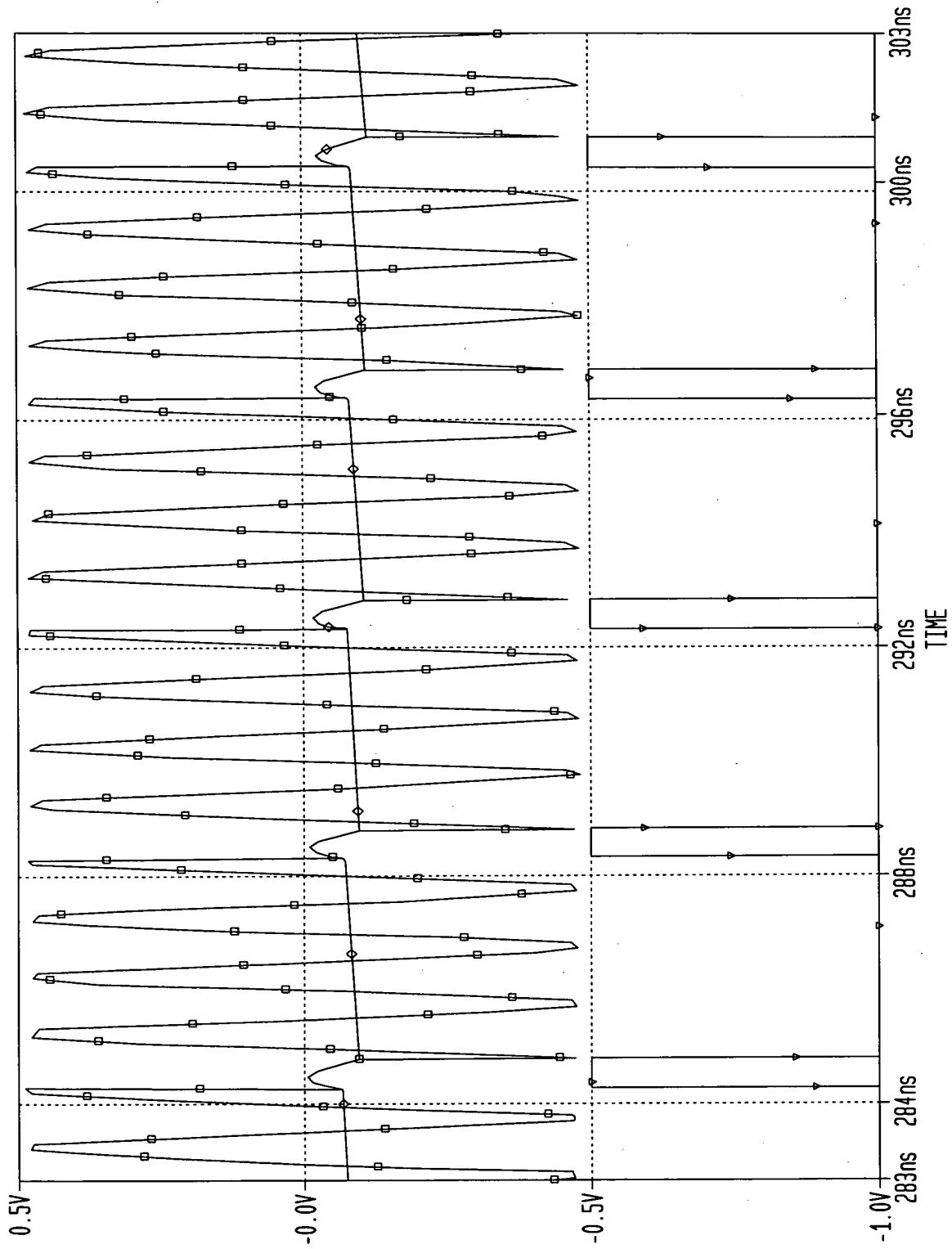


FIG. 227

## FIG. 228

### CHARGE TRANSFER

#### DEFINITIONS:

q=CHARGE IN COULOMBS  
 C=CAPACITANCE IN FARADS  
 V=VOLTAGE IN VOLTS  
 A=INPUT SIGNAL AMPLITUDE

$$\begin{aligned} q &= C \cdot V \\ V &= A \cdot \sin(t) \\ q(t) &= C \cdot A \cdot \sin(t) \\ \Delta q(t) &= C \cdot A \cdot \sin(t) - C \cdot A \cdot \sin(t-T) \\ \Delta q(t) &= C \cdot A \cdot (\sin(t) - \sin(t-T)) \end{aligned} \quad \text{EQUATION A}$$

$\Delta q(t)$  EXPRESSES THE CHANGE IN CHARGE ACROSS CAPACITOR C DURING APERTURE T. AS CAN BE SEEN, WHEN APERTURE T TENDS TOWARDS 0,  $\Delta q(t)$  TENDS TOWARDS 0.

## FIG. 229

USING THE SUM TO PRODUCT TRIGONOMETRIC IDENTITY,

$$\sin(\alpha) - \sin(\beta) = 2 \cdot \sin\left(\frac{\alpha - \beta}{2}\right) \cdot \cos\left(\frac{\alpha + \beta}{2}\right) \quad \text{IDENTITY 1}$$

EQUATION 1 CAN BE RE-WRITTEN AS:

$$\Delta q(t) = 2 \cdot C \cdot A \cdot \sin\left[\frac{t - (t-T)}{2}\right] \cdot \cos\left[\frac{t + (t-T)}{2}\right]$$

$$\Delta q(t) = 2 \cdot C \cdot A \cdot \sin\left(\frac{1}{2} \cdot T\right) \cdot \cos\left(t - \frac{1}{2} \cdot T\right) \quad \text{EQUATION B}$$

THE  $\sin$  TERM IN EQUATION B IS A FUNCTION OF APERTURE  $T$  ONLY.  
 IT IS EASILY SEEN THAT  $\Delta q(t)$  WILL OBTAIN A MAXIMUM VALUE WHEN  
 $T$  IS EQUAL TO AN ODD MULTIPLE OF  $\pi$  i.e.,  $\pi, 3\pi, 5\pi, \dots$   
 THEREFORE, CAPACITOR  $C$  EXPERIENCES THE GREATEST CHANGE IN  
 CHARGE WHEN THE APERTURE HAS A VALUE OF  $\pi$  OR A TIME INTERVAL  
 REPRESENTATIVE OF 180 DEGREES OF THE INPUT SINUSOID.  
 CONVERSELY, WHEN  $T$  IS EQUAL TO  $2\pi, 4\pi, 6\pi, \dots$  MINIMAL CHARGE  
 IS TRANSFERRED.

**FIG. 230**

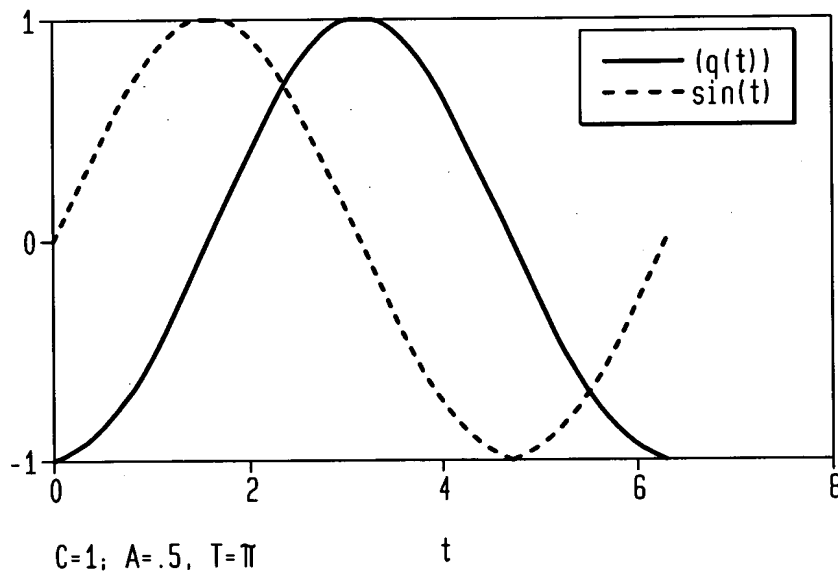
SOLVING FOR  $q(t)$  BY INTEGRATING EQUATION A ALLOWS  
 THE CHARGE ON C WITH RESPECT TO TIME TO BE GRAPHED  
 ON THE SAME AXIS AS THE INPUT SINUSOID  $\sin(t)$ .

$$q(t) = \int C \cdot A \cdot (\sin(t) - \sin(t-T)) dt$$

$$q(t) = -\cos(t) \cdot C \cdot A + \cos(t-T) \cdot C \cdot A$$

$$q(t) = C \cdot A \cdot (\cos(t-T) - \cos(t)) \quad \text{EQUATION C}$$

**FIG. 231**



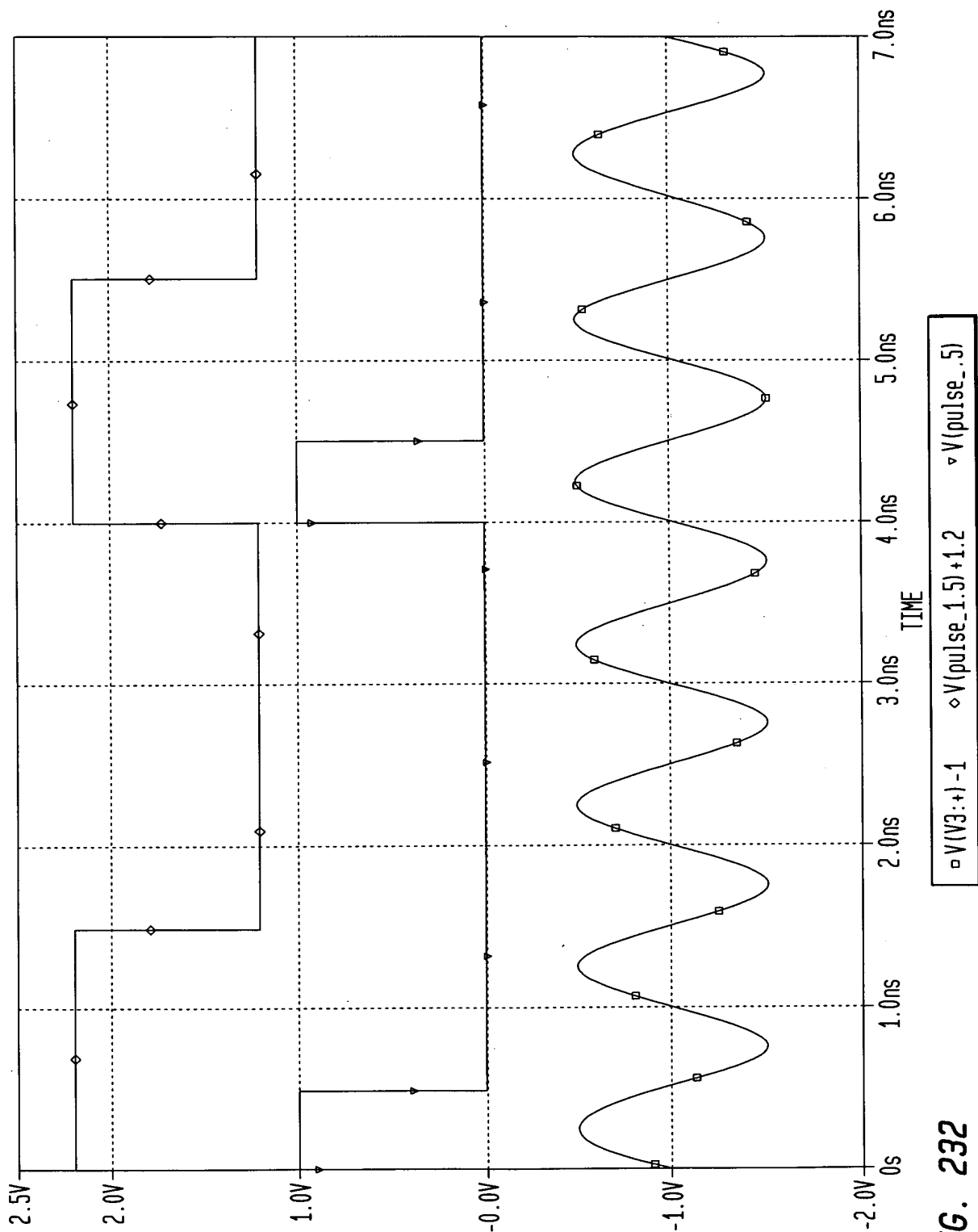
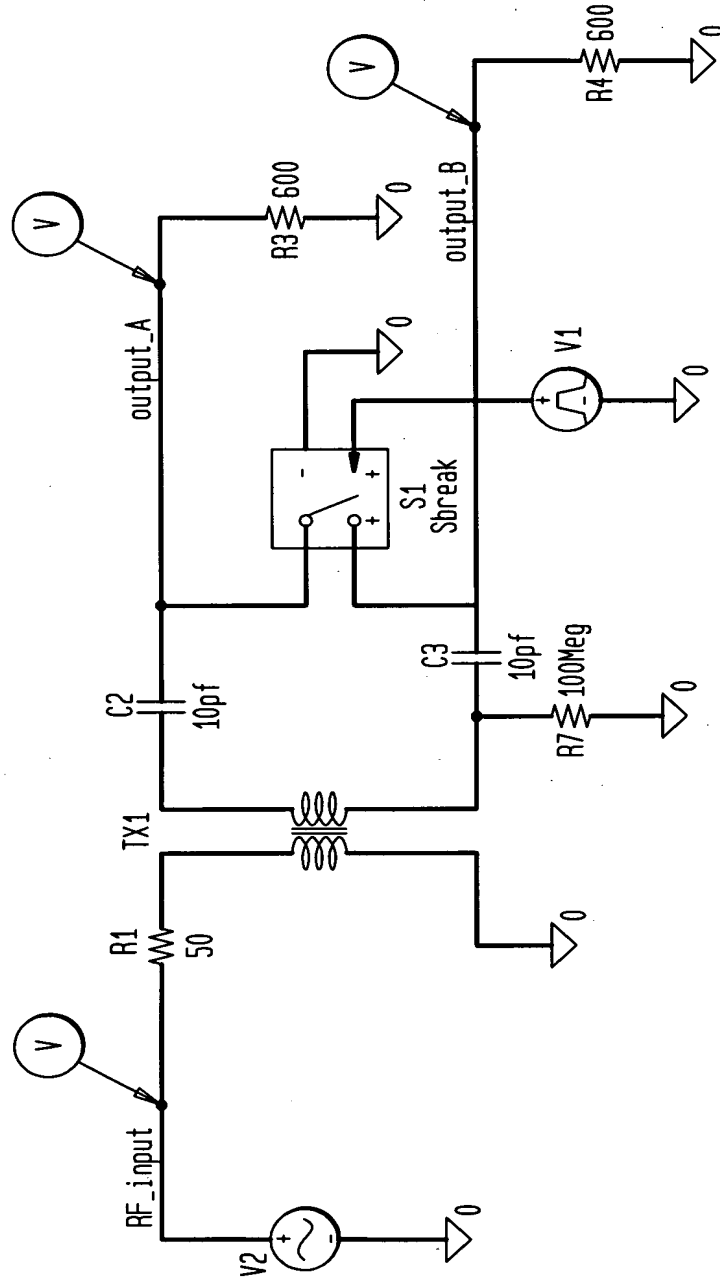
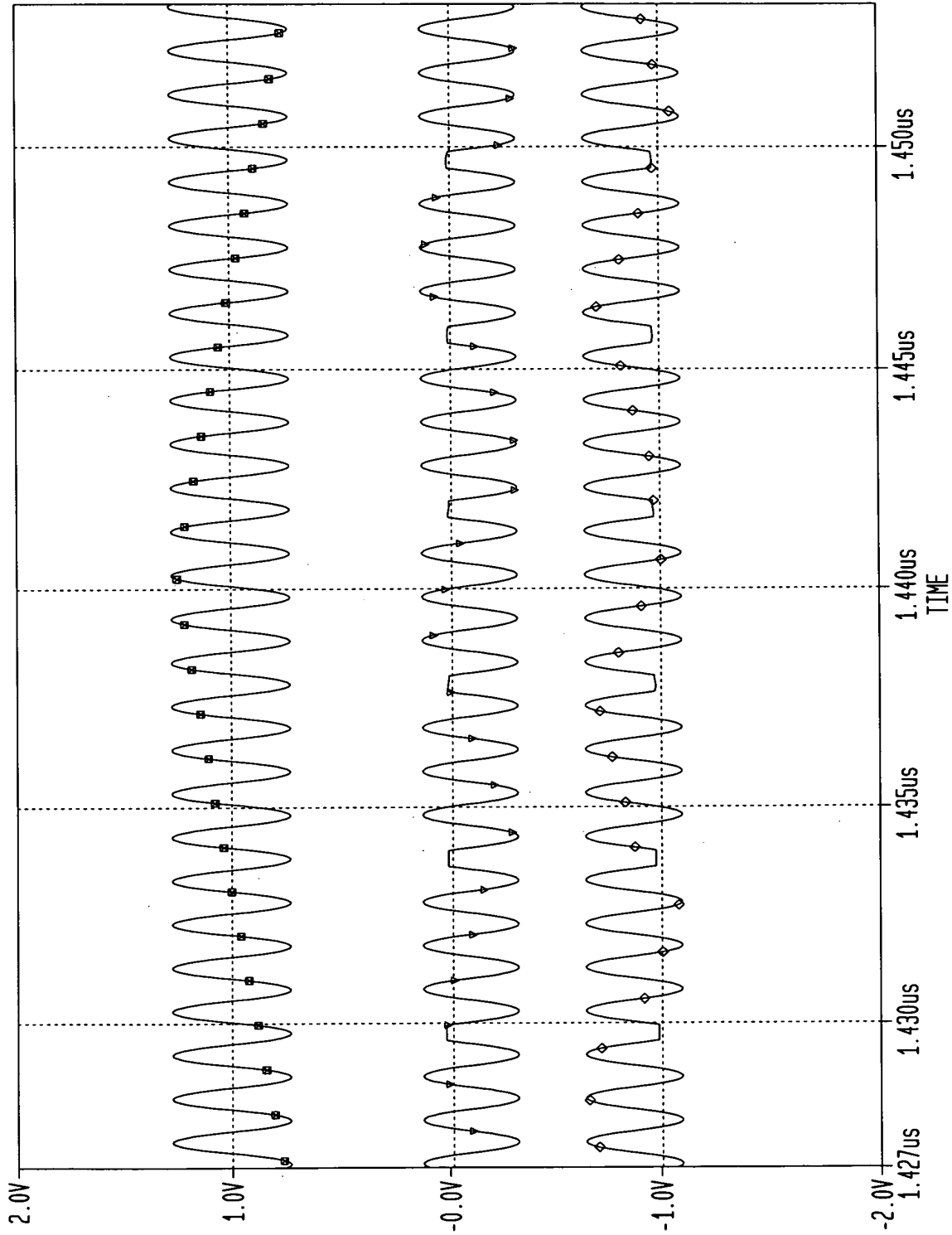


FIG. 232

FIG. 233

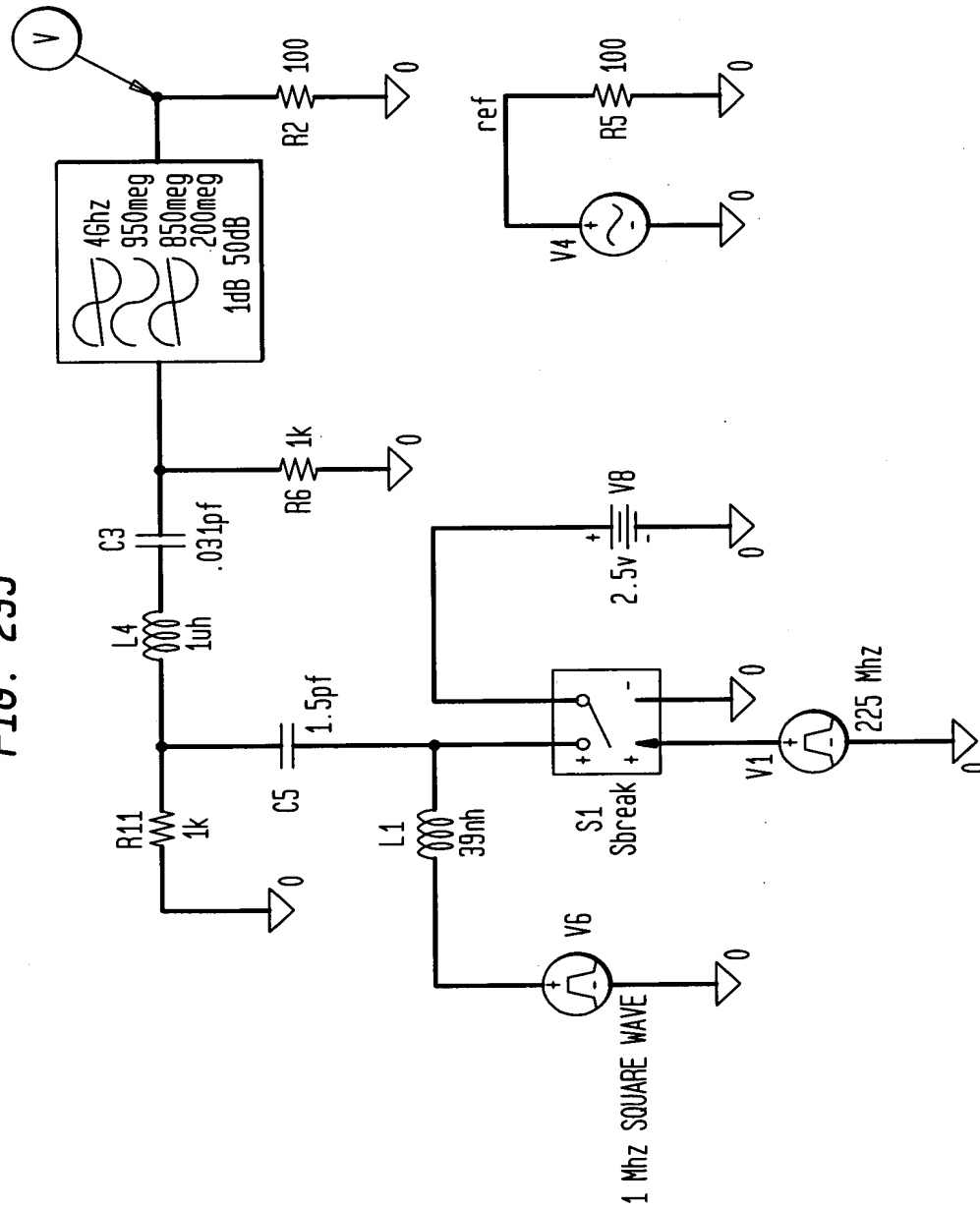




□  $.5 \cdot V(\text{RF\_input}) + 1.0$  ◇  $V(\text{output\_A}) - 1$  ▽  $V(\text{output\_B})$

FIG. 234

FIG. 235



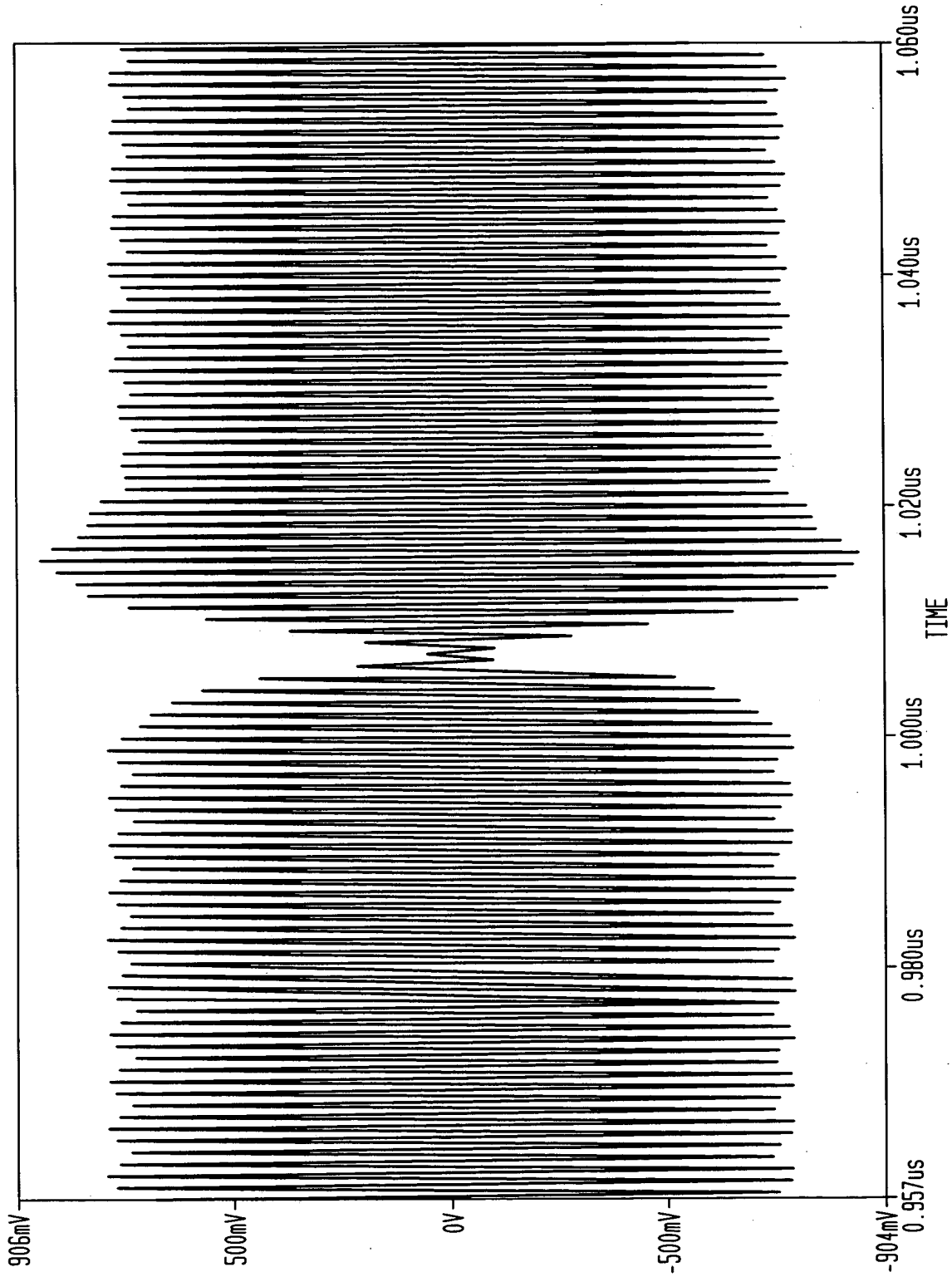


FIG. 236

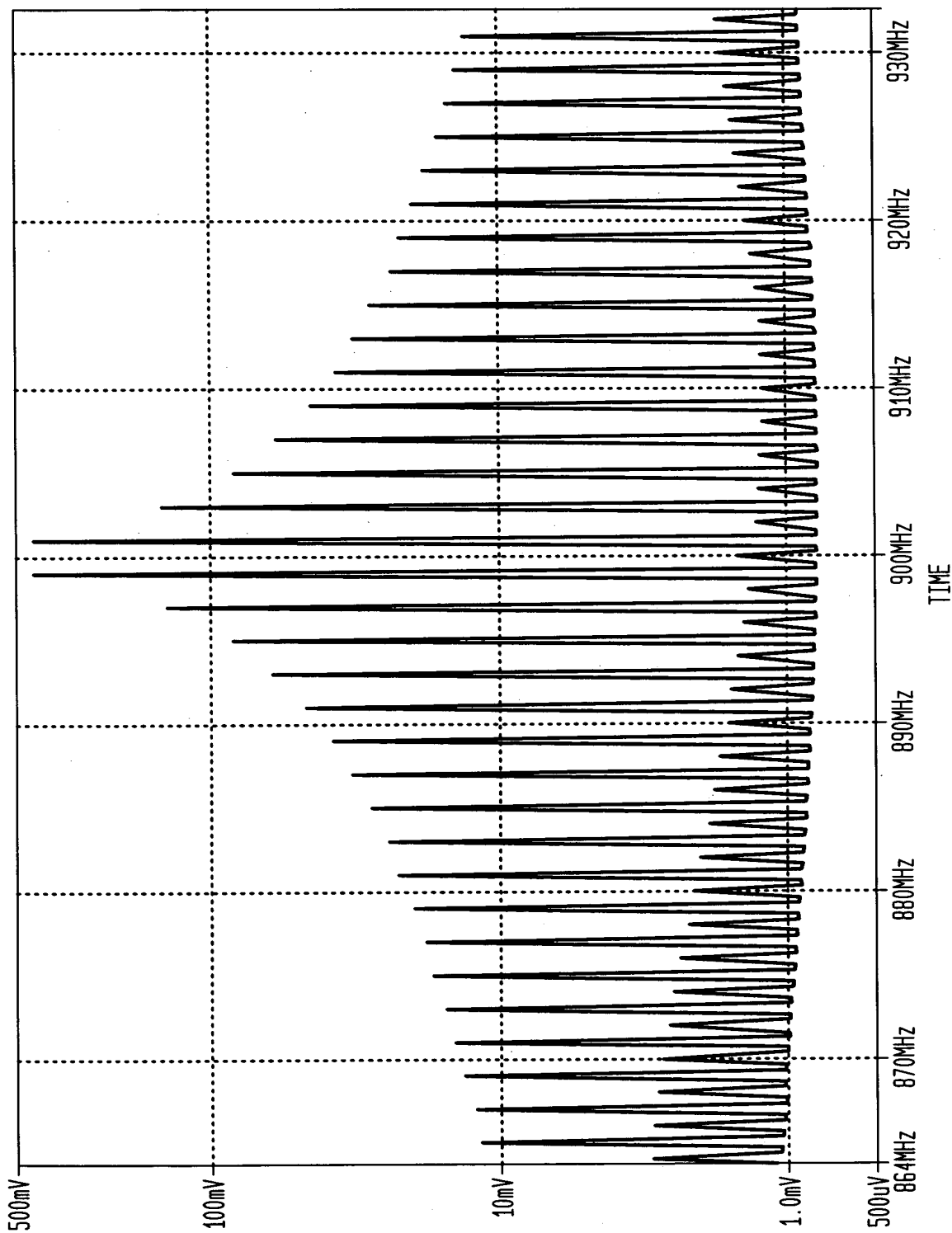
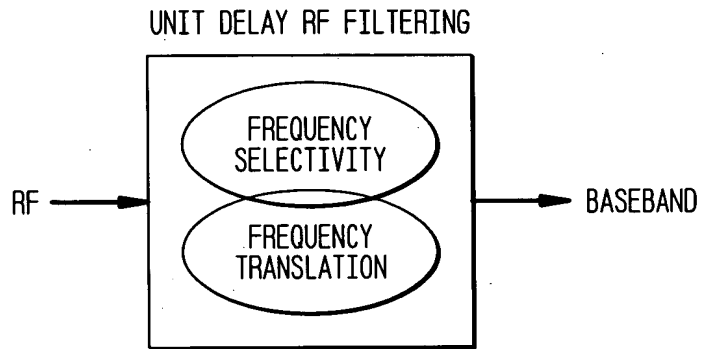
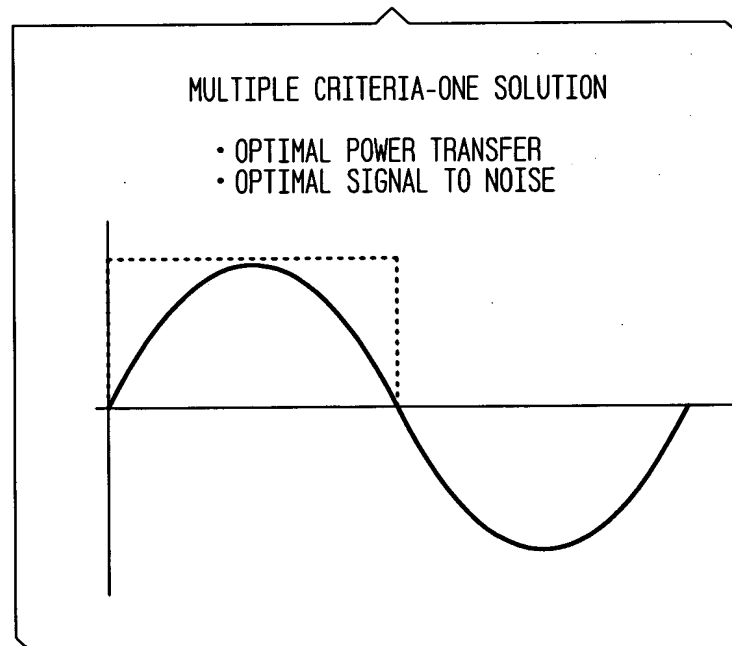


FIG. 237

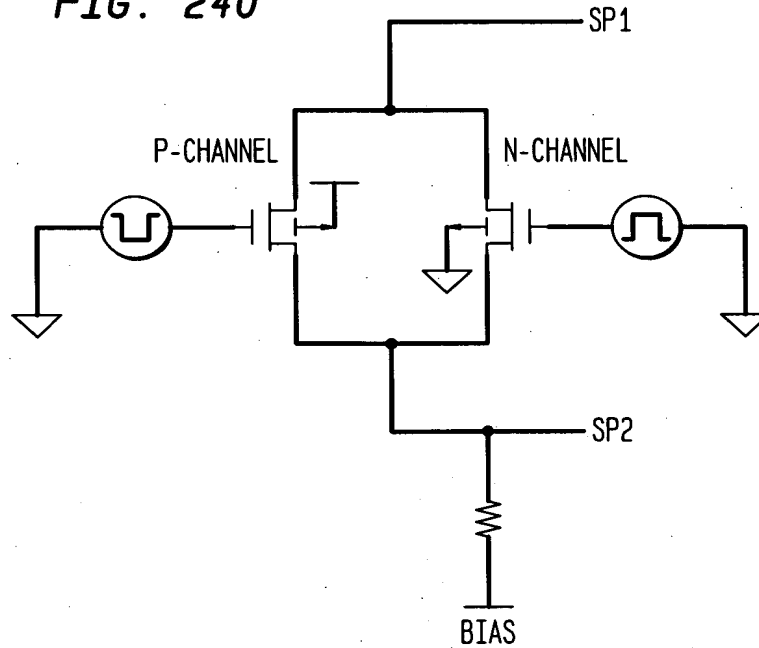
**FIG. 238**



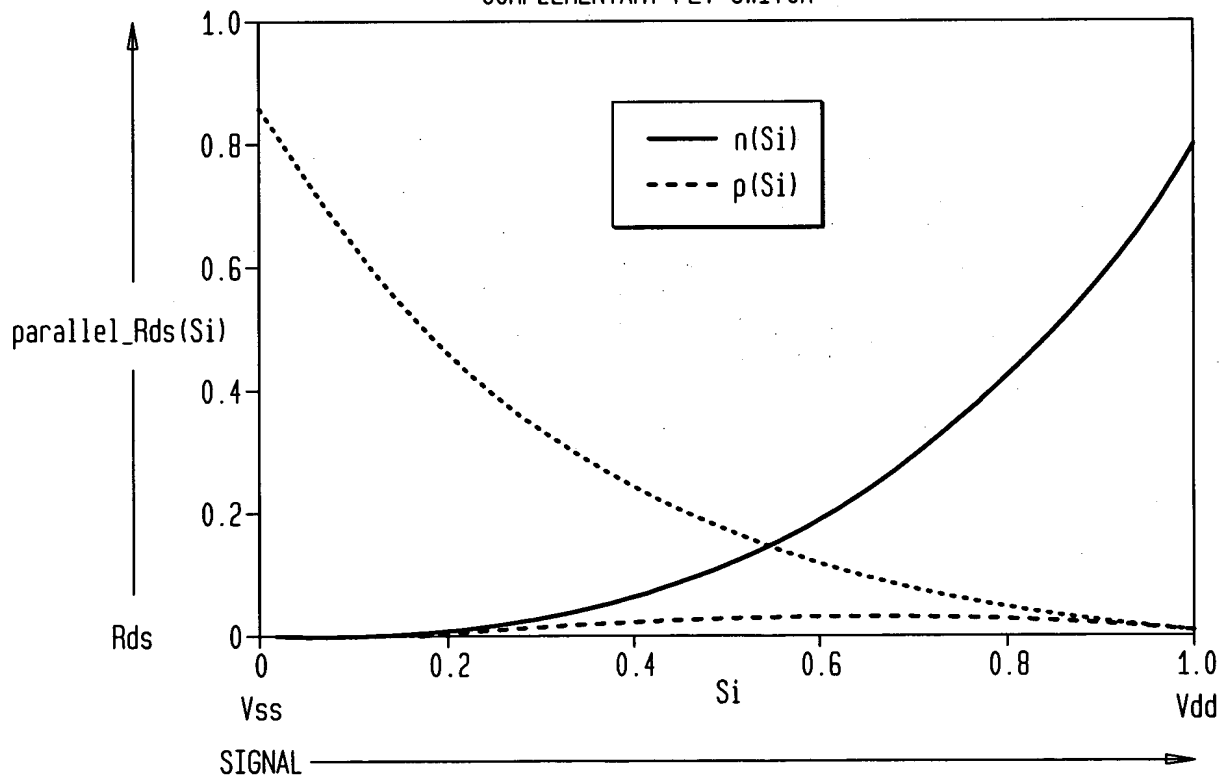
**FIG. 239**



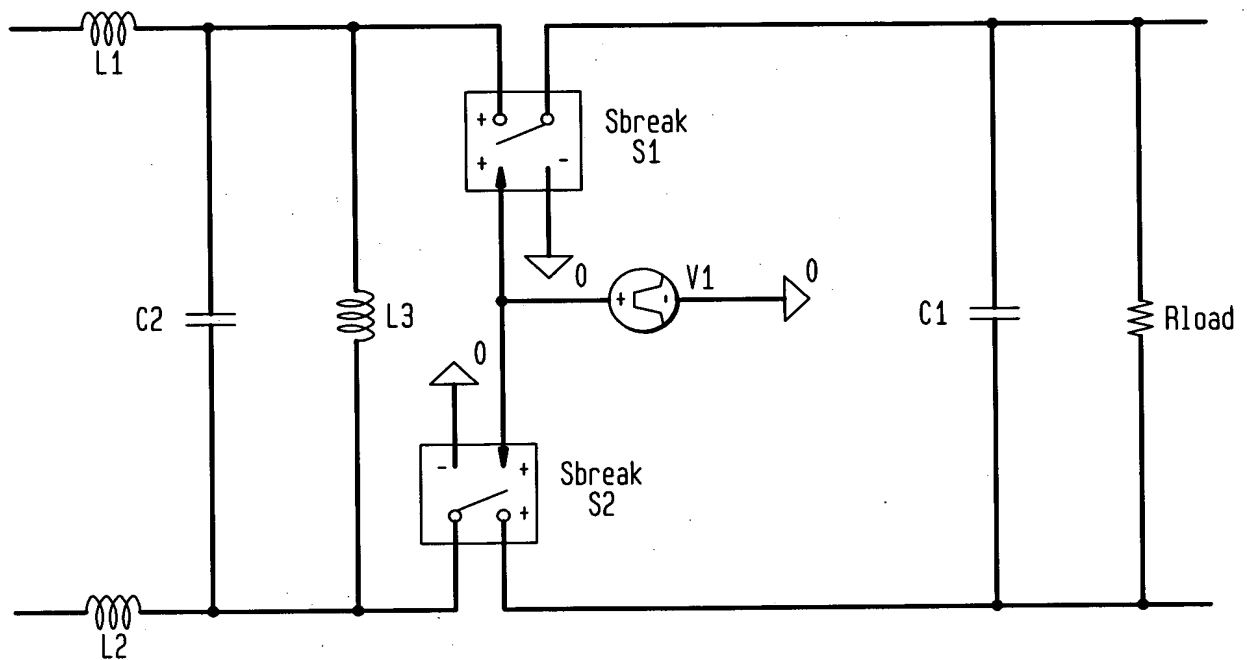
**FIG. 240**



**FIG. 241**  
 COMPLEMENTARY FET SWITCH



**FIG. 242**  
 DIFFERENTIAL CONFIGURATION



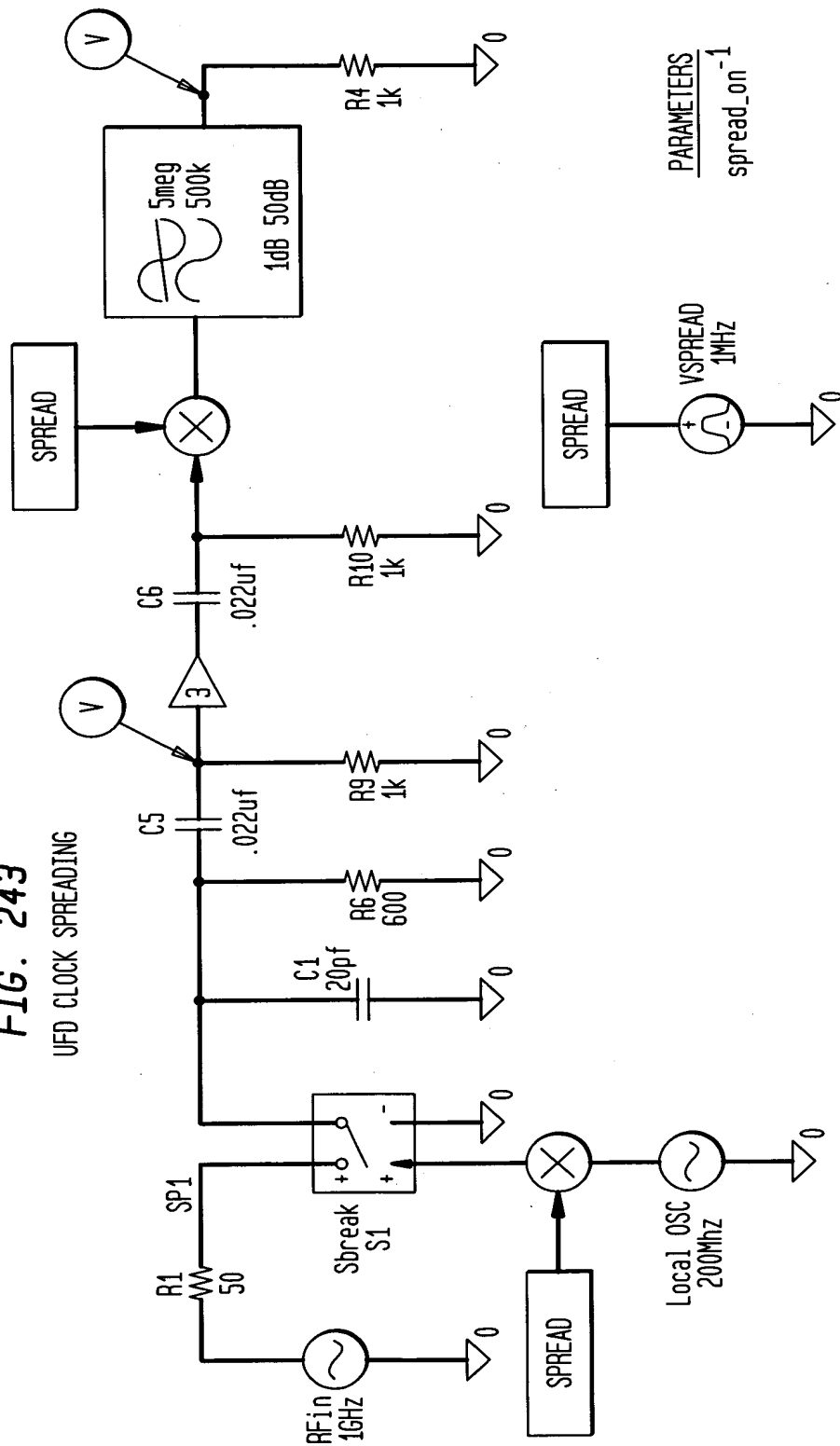


FIG. 244

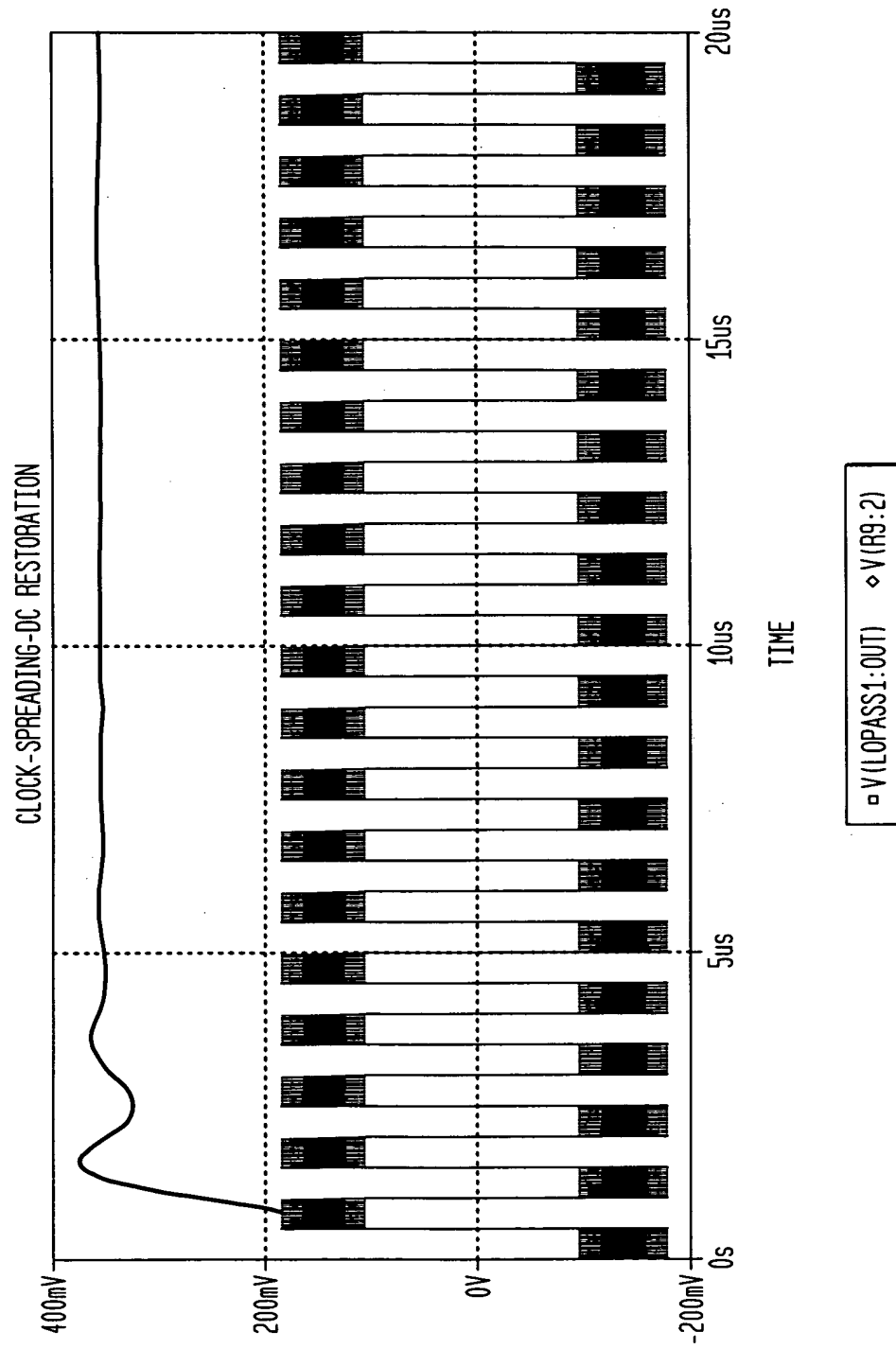
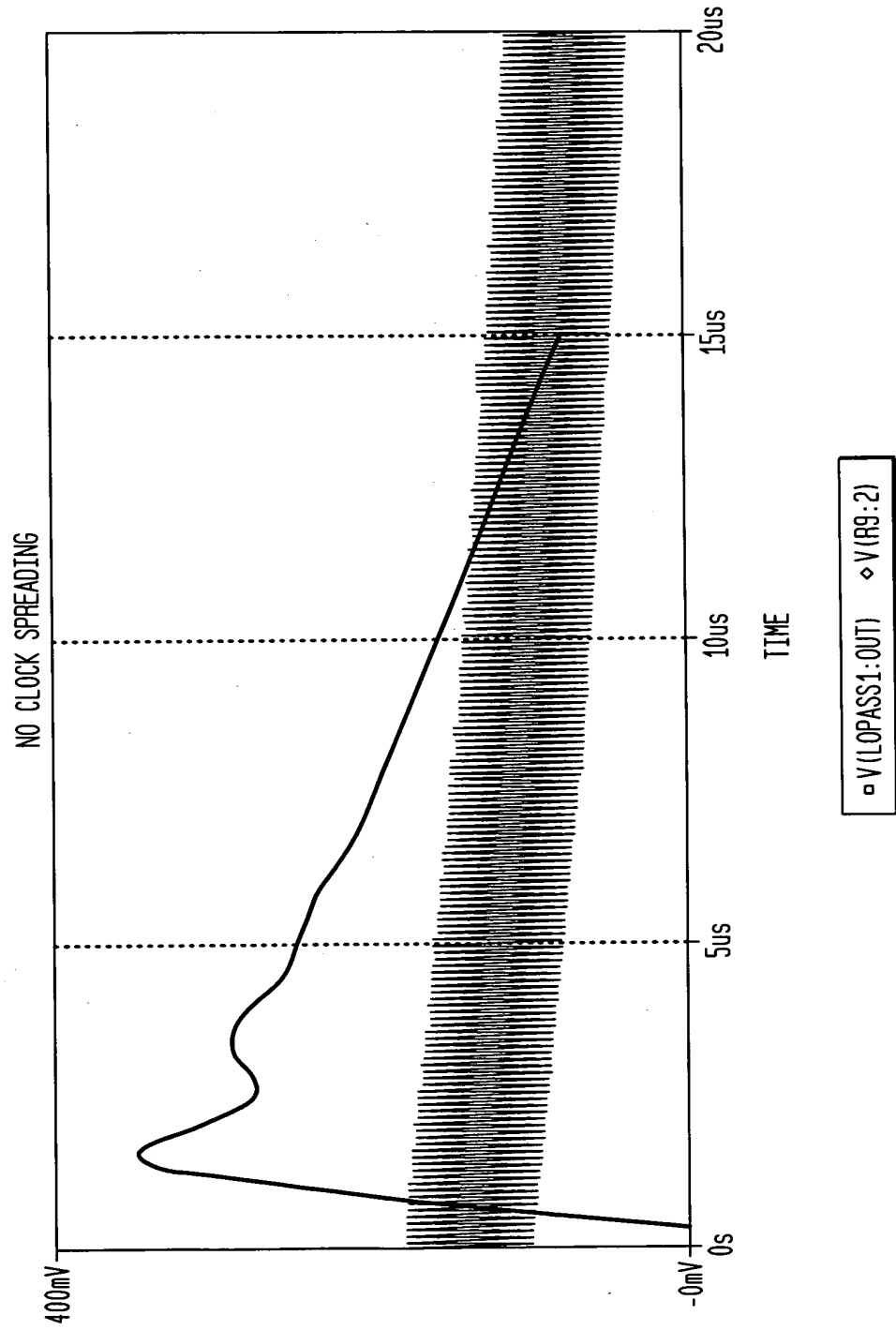
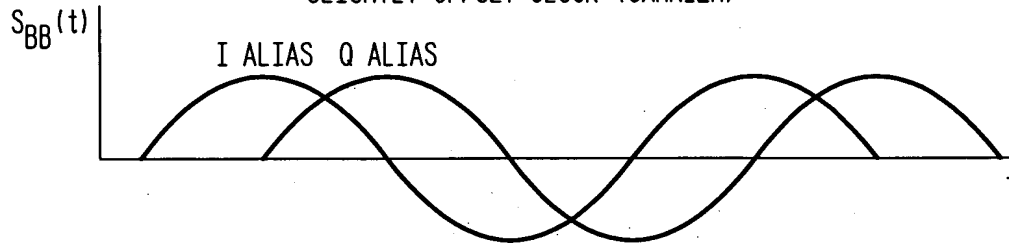


FIG. 245



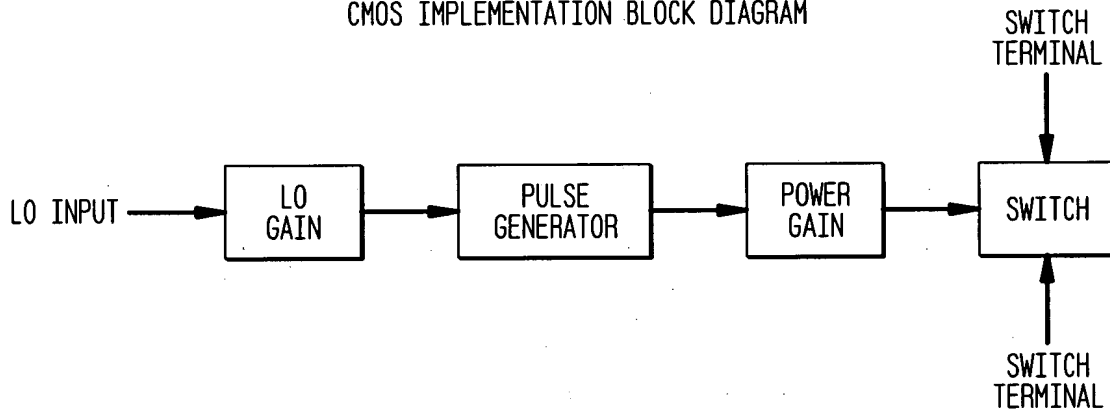
**FIG. 246**

B.B. RECOVERED I/Q WAVEFORMS WITH  
 SLIGHTLY OFFSET CLOCK (CARRIER)



**FIG. 247**

CMOS IMPLEMENTATION BLOCK DIAGRAM



**FIG. 248**

LO GAIN BLOCK AT GATE LEVEL

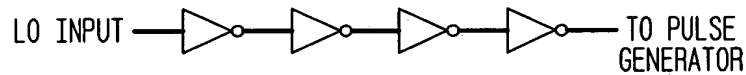
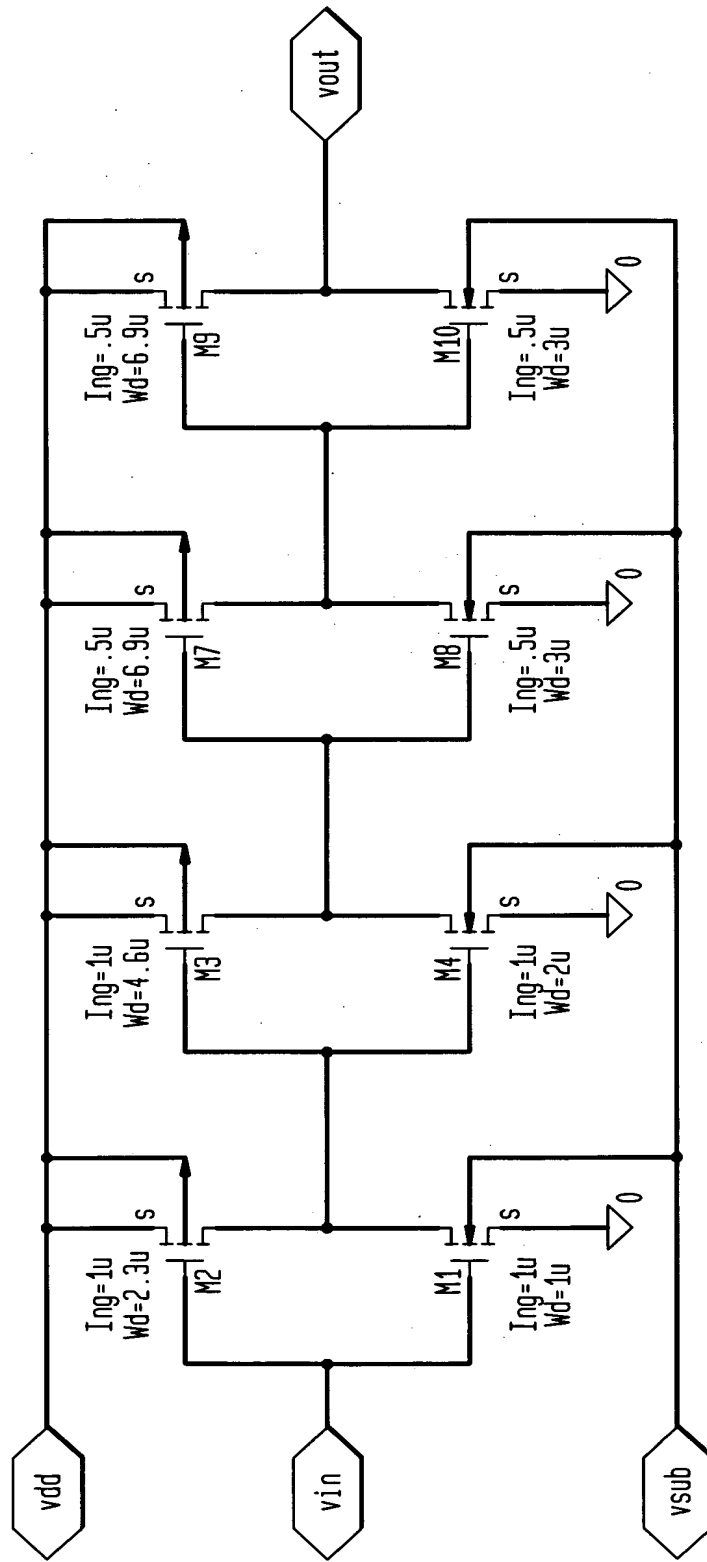


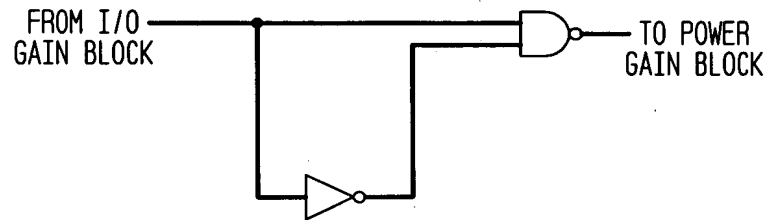
FIG. 249

LO GAIN BLOCK AT TRANSISTOR LEVEL



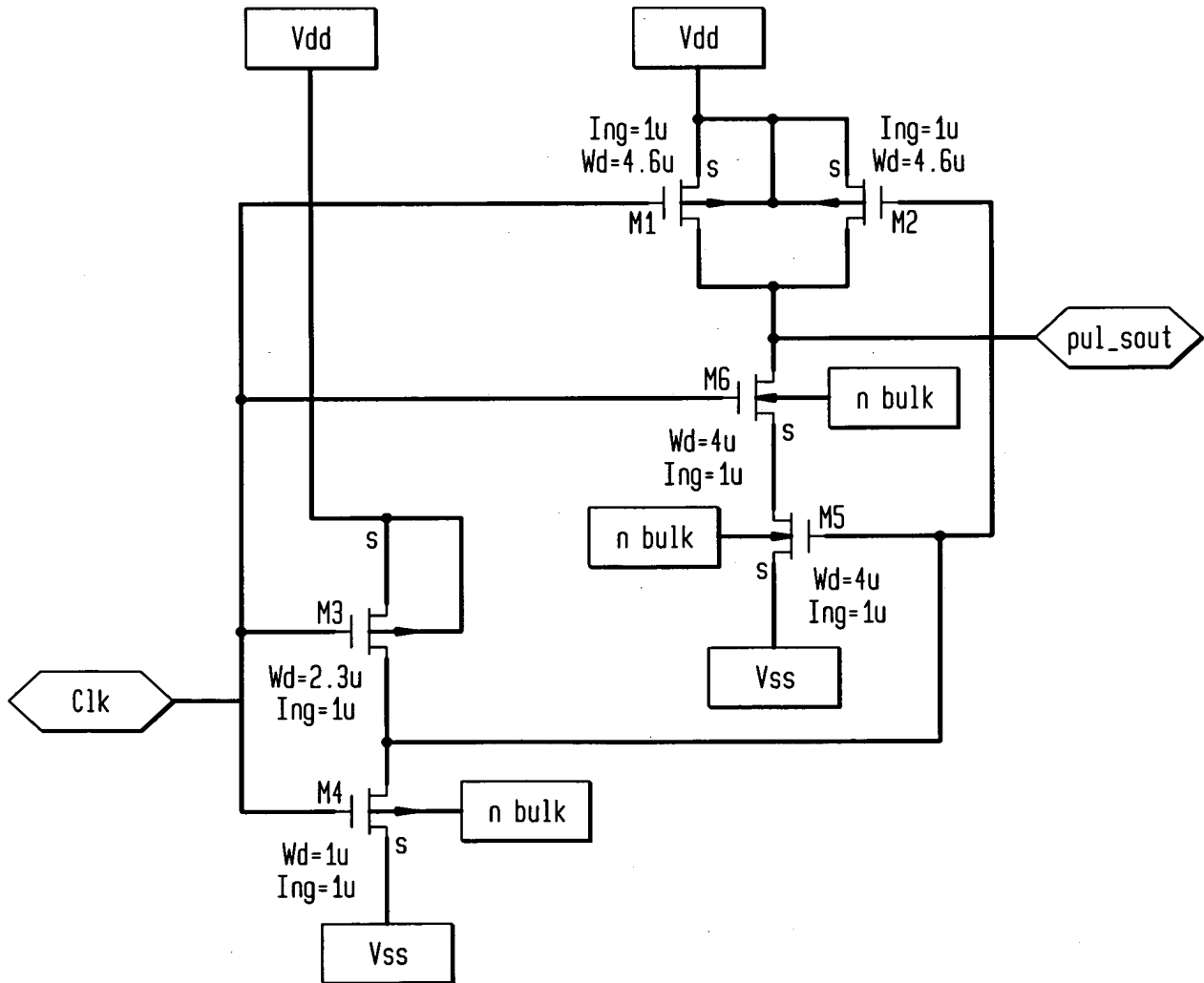
**FIG. 250**

PULSE GENERATOR#1 AT GATE LEVEL



**FIG. 251**

PULSE GENERATOR#1 AT TRANSISTOR LEVEL



**FIG. 252**

POWER GAIN BLOCK AT GATE LEVEL

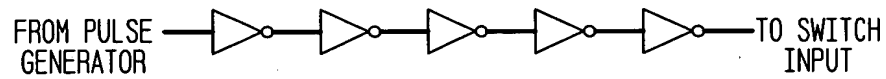


FIG. 253

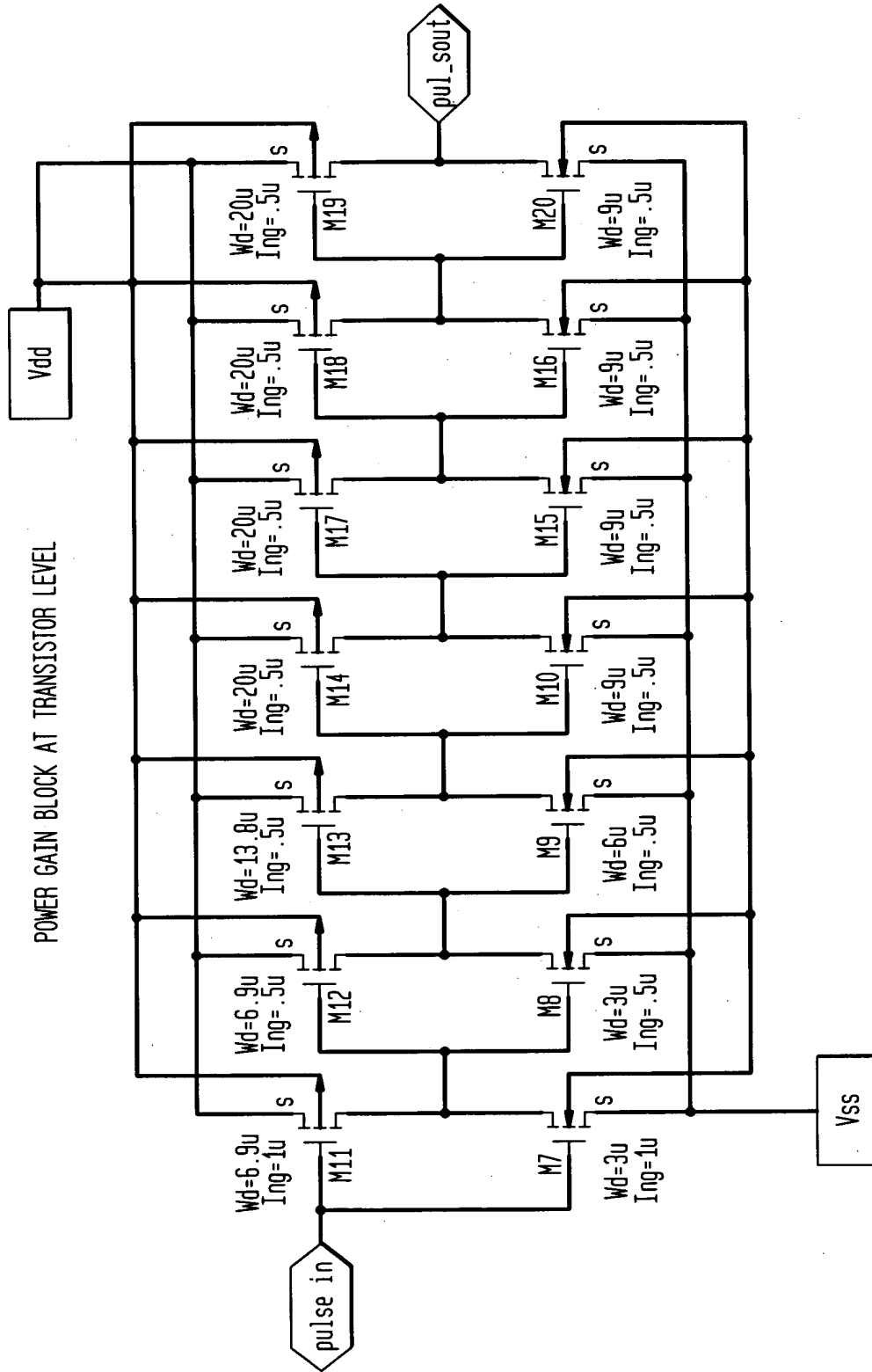
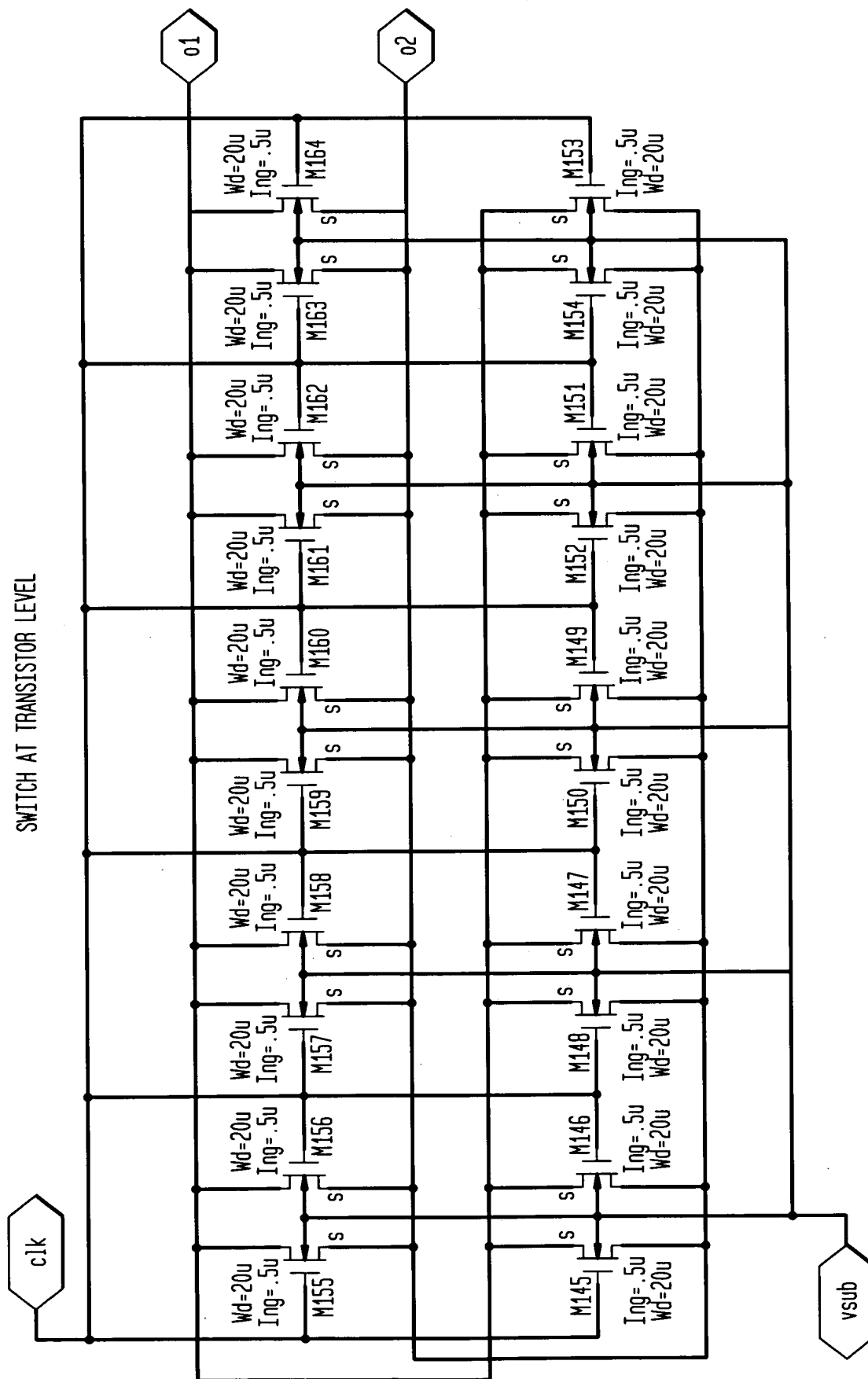


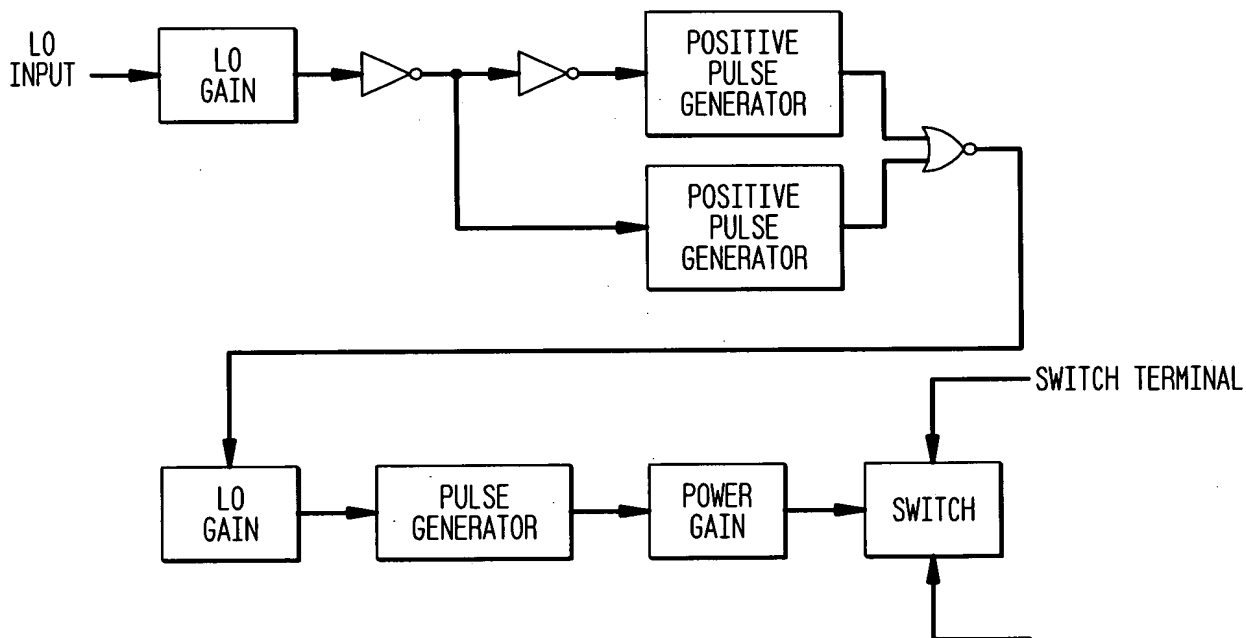
FIG. 254

SWITCH AT TRANSISTOR LEVEL



**FIG. 255**

CMOS "HOT CLOCK" BLOCK DIAGRAM



**FIG. 256**

POSITIVE PULSE GENERATOR AT GATE LEVEL

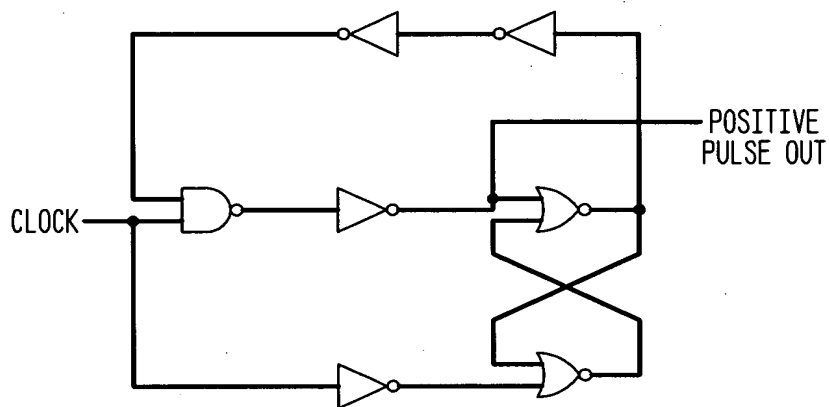
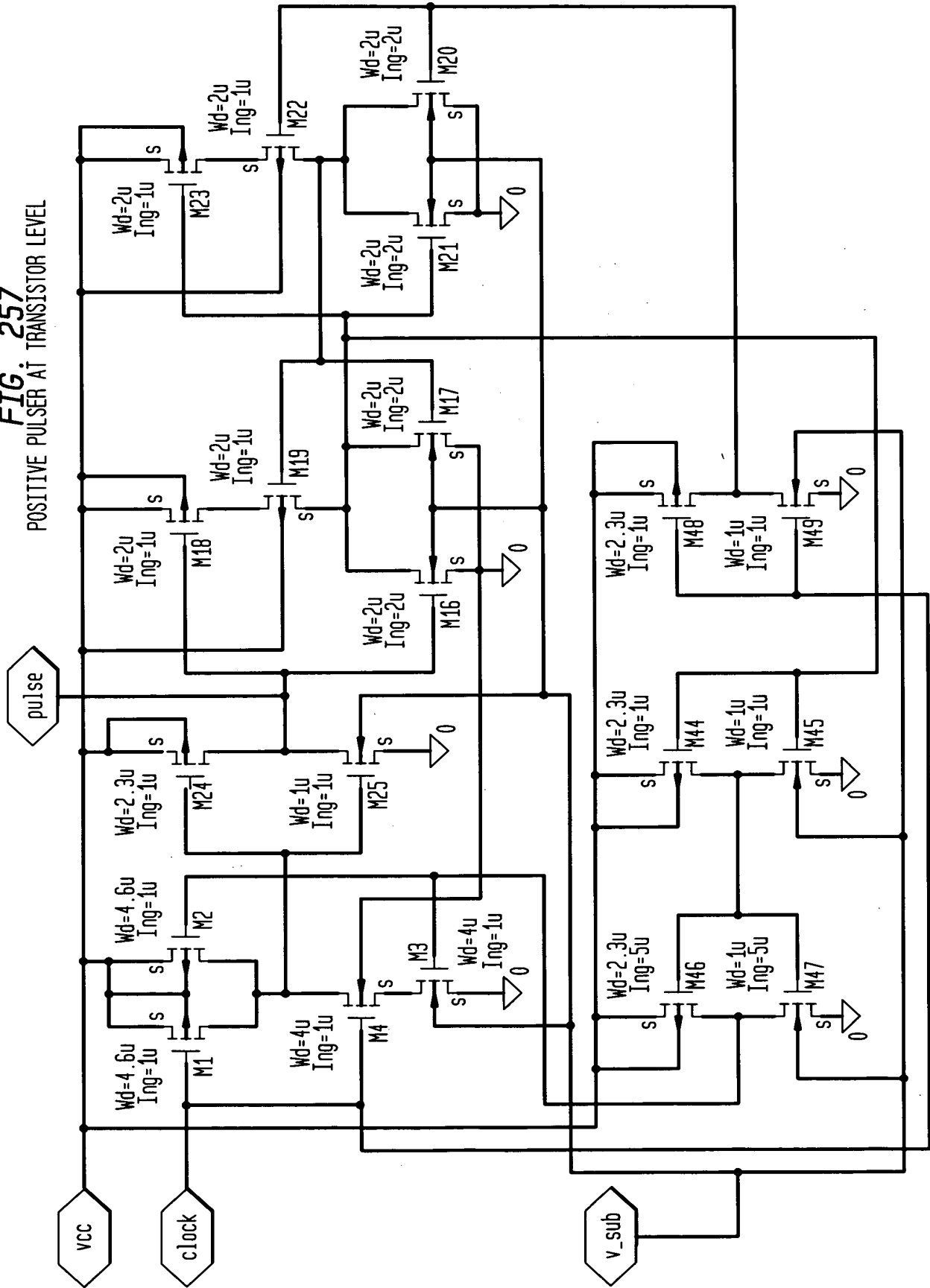


FIG. 257

POSITIVE PULSER AT TRANSISTOR LEVEL



**FIG. 258**

PULSE WIDTH ERROR EFFECT FOR 1/2 CYCLE

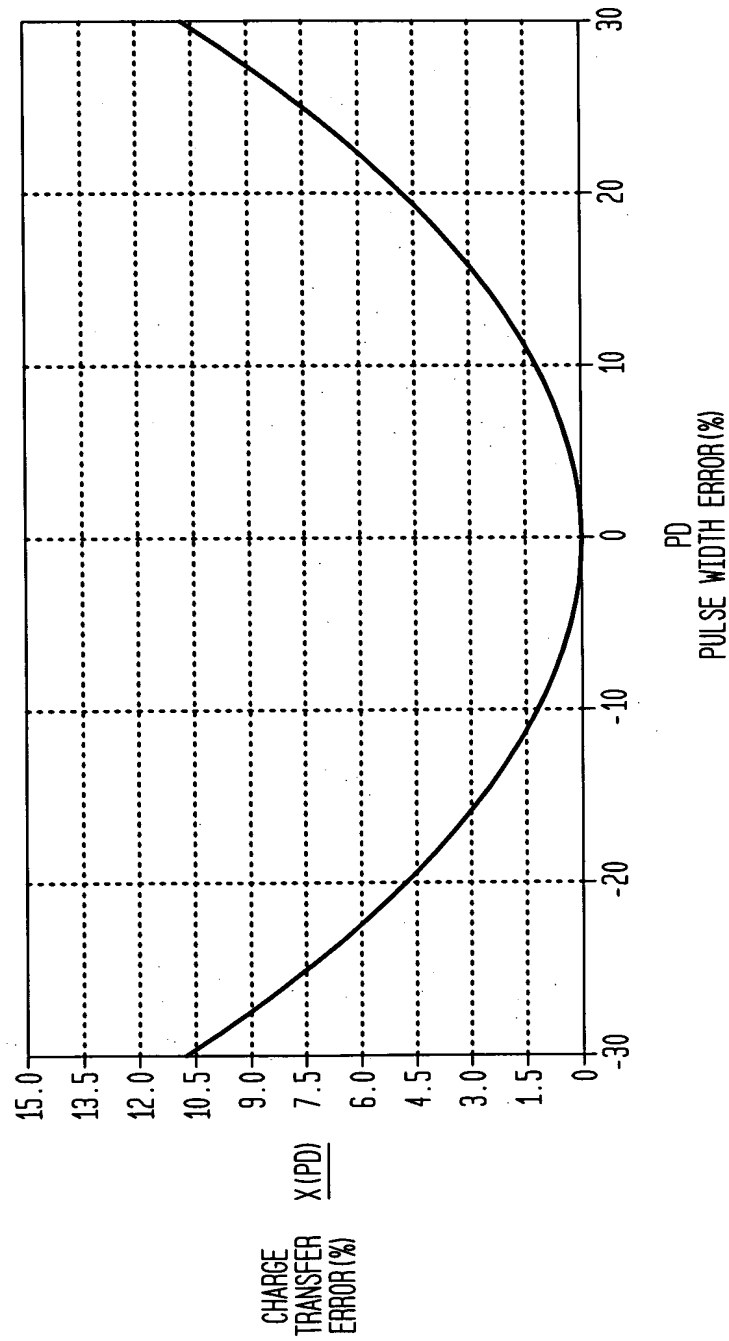
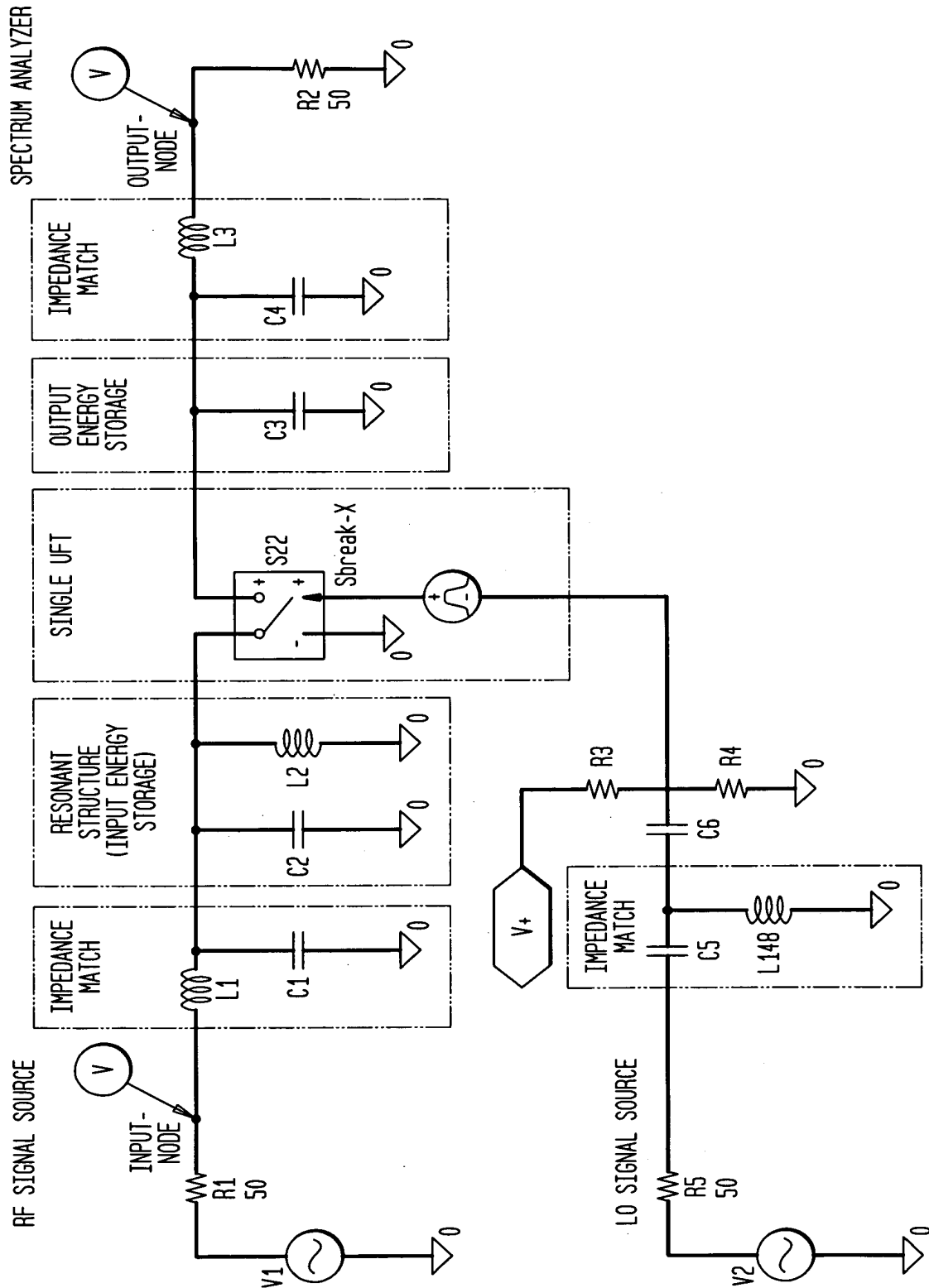


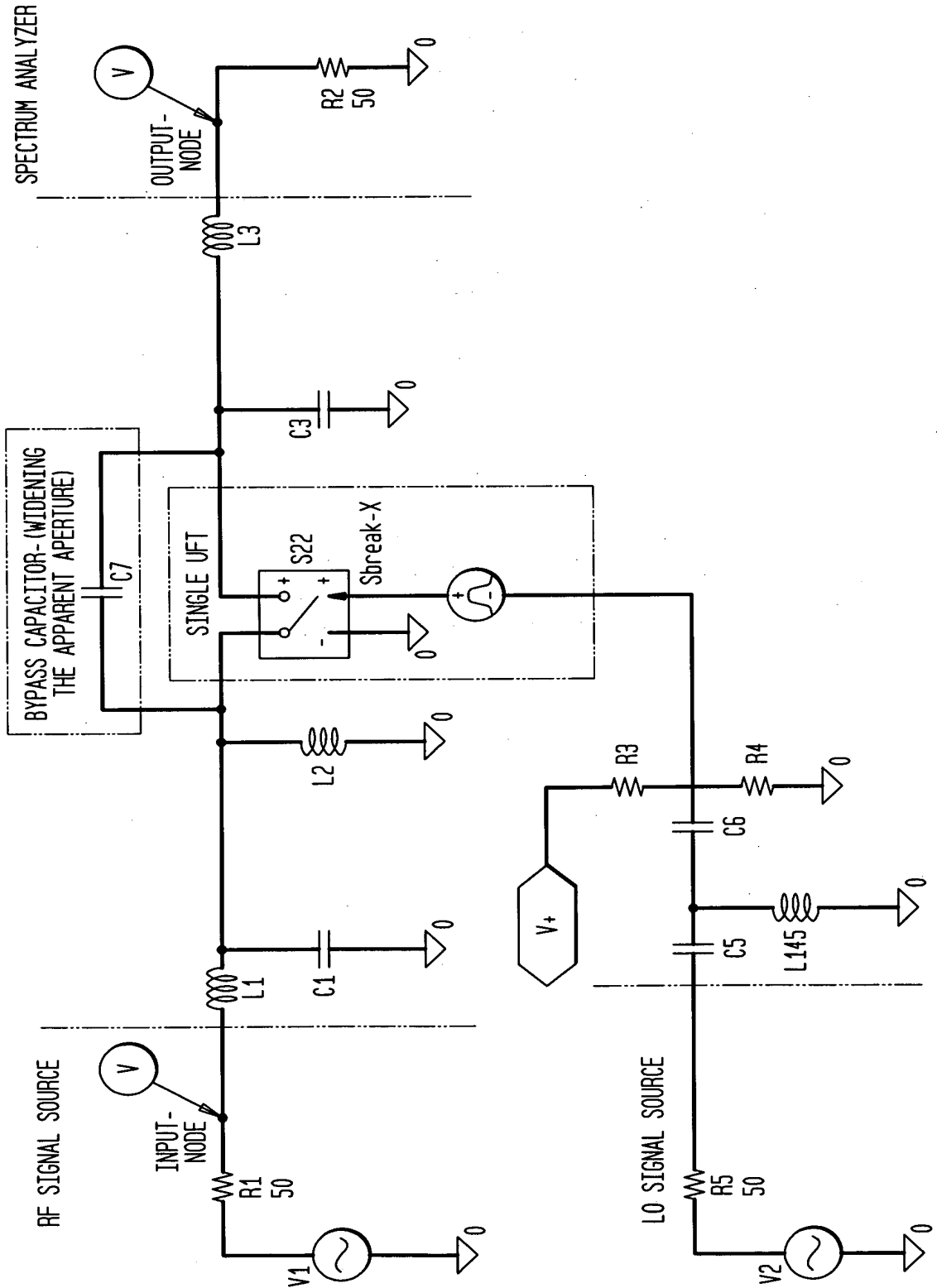
FIG. 259

SINGLE-ENDED UFD MODULE

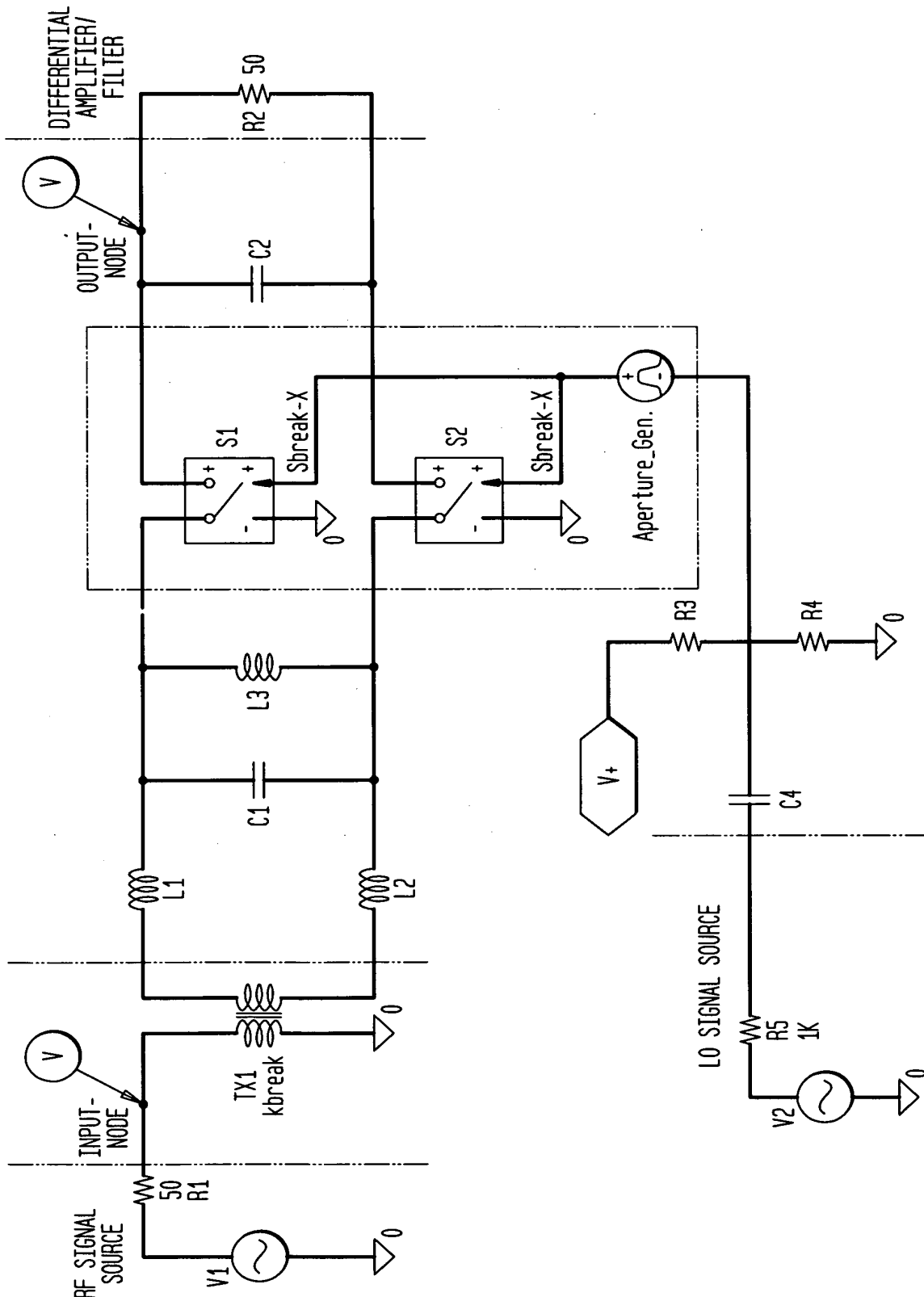


**FIG. 260**

SINGLE-ENDED UFD MODULE



**FIG. 261**  
**FULL DIFFERENTIAL**



**FIG. 262**  
**FULL DIFFERENTIAL**

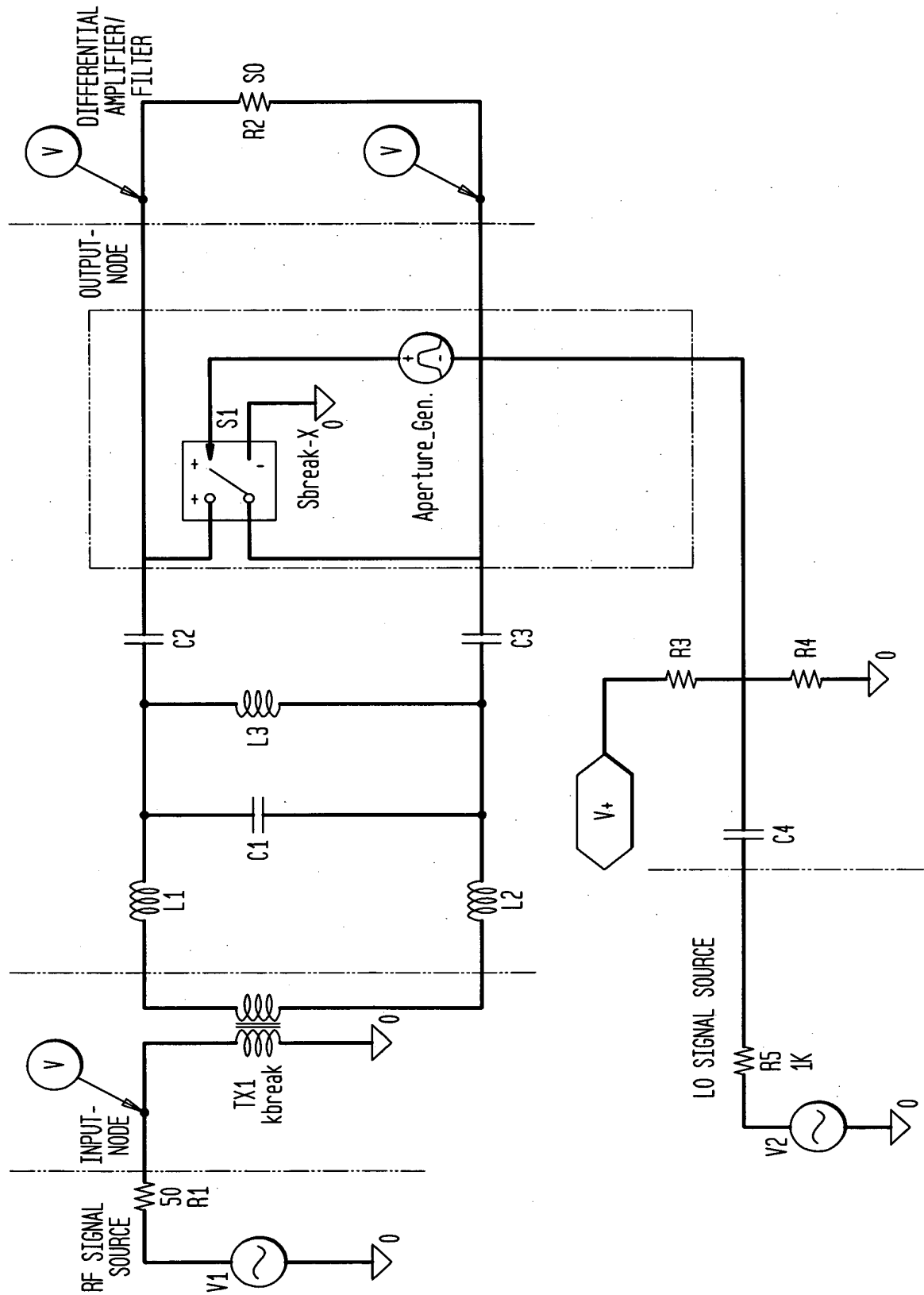




FIG. 264

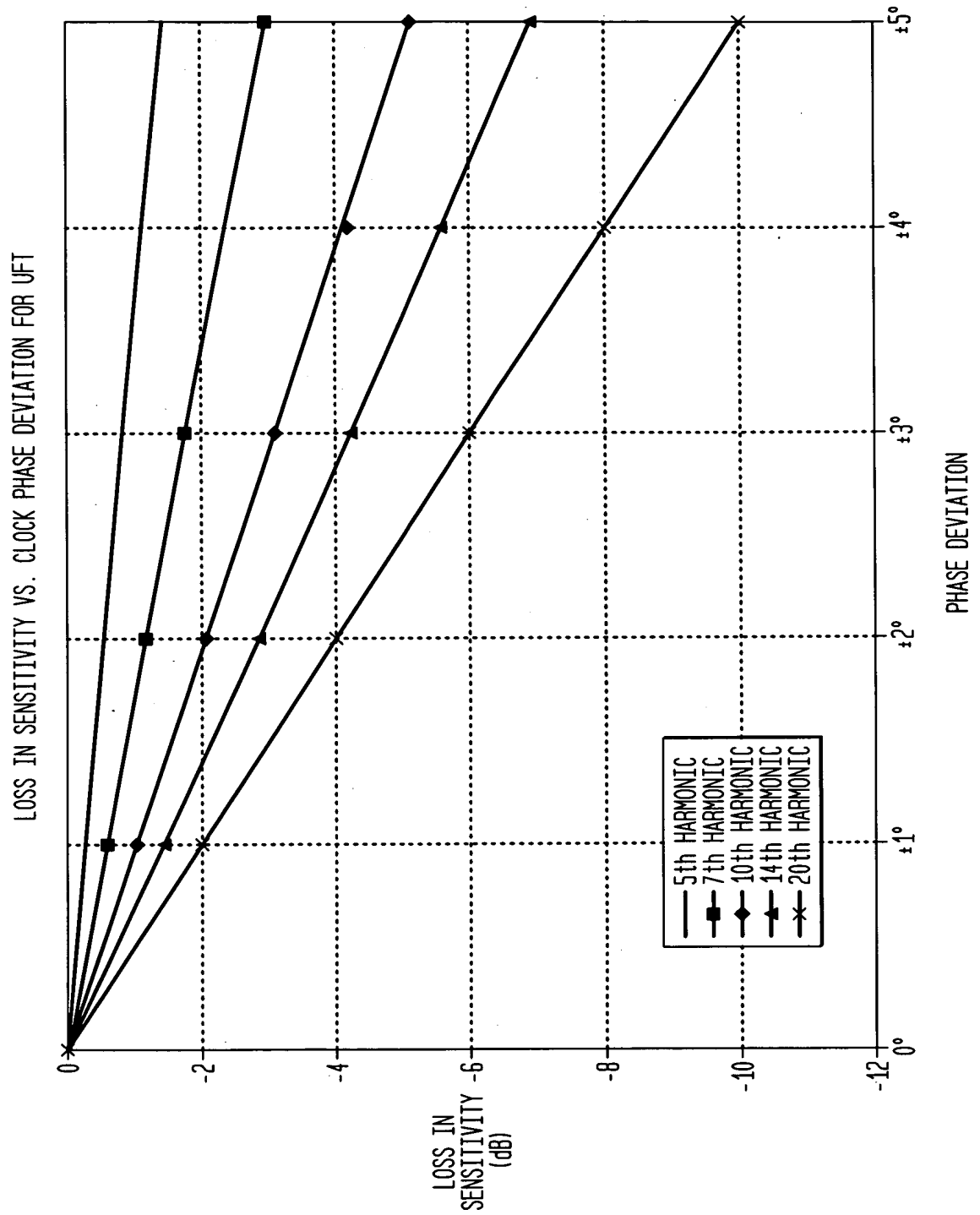
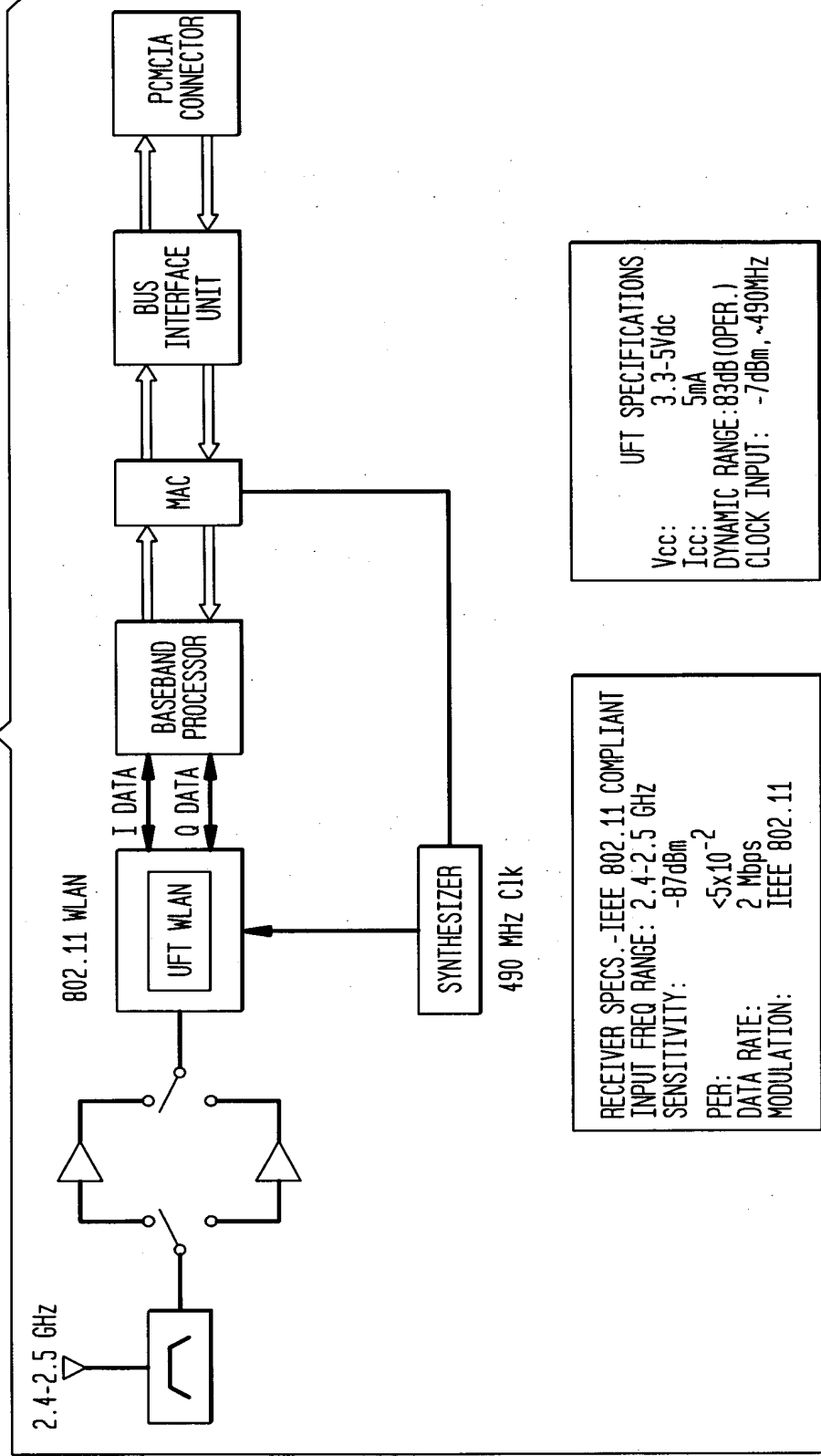


FIG. 265



802.11 WLAN-RECEIVER/TRANSMITTER

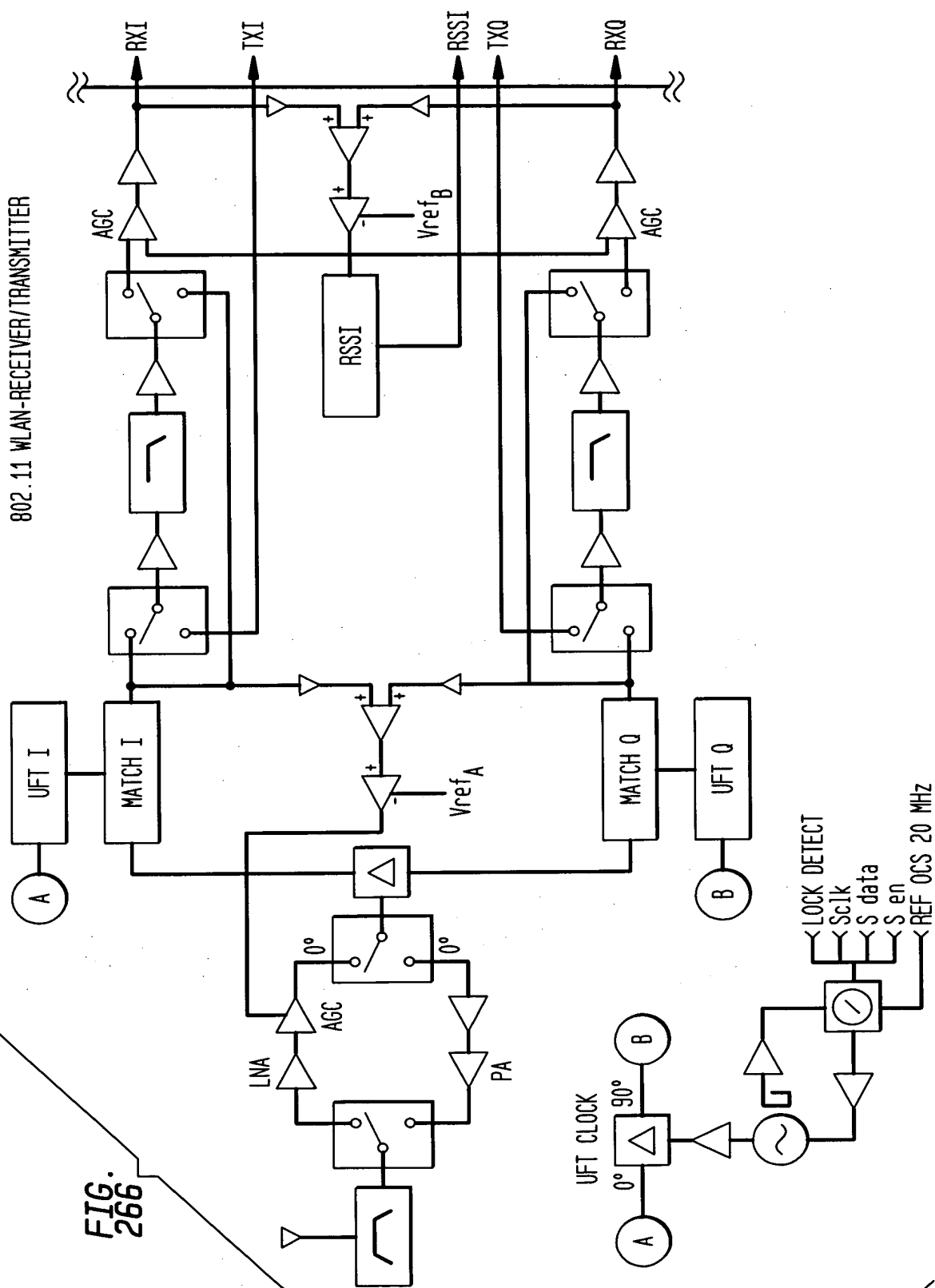
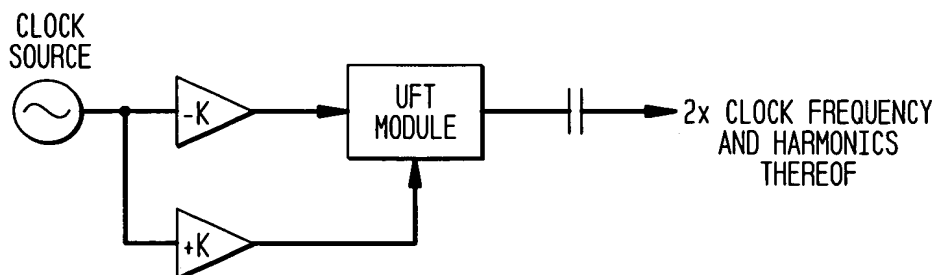


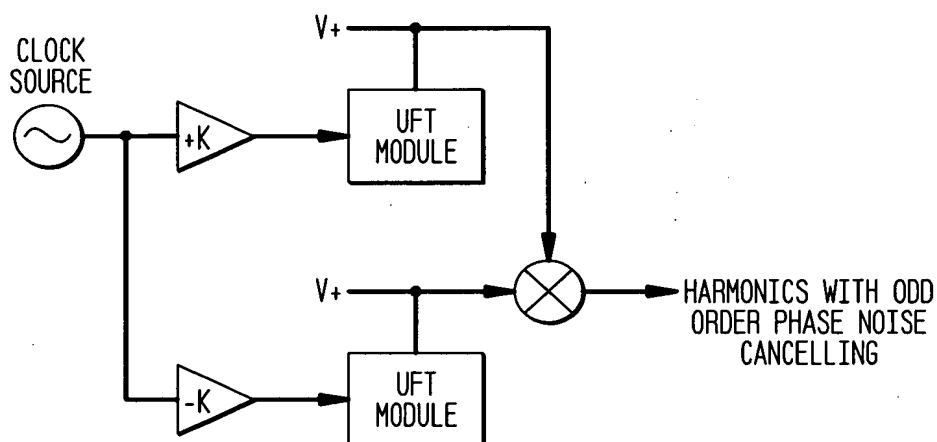
FIG. 267

PARAMETER	802.11 REQUIREMENT OR INDUSTRY PRACTICE	UFT MODULE BASED RX PERFORMANCE
OPERATING BAND	2.4-2.5 GHz	2.4-2.5 GHz
CHANNELS	2.402 TO 2.495 IN 1 MHz STEPS 2.412 TO 2.484 GHz IN 5 MHz STEPS	2.402 TO 2.495 IN 1 MHz STEPS 2.412 TO 2.484 GHz IN 5 MHz STEPS
MODULATION	BPSK, QPSK, (BARKER, CCK)	BPSK, QPSK
TX SPECTRAL MASK	FIRST SIDELOBE REJECT<-30, +15dBm SECOND SIDELOBE REJECT<-50, +15dBm	-35 dBc, -55dBc
EYE OPENING	$V_{err} < .35$ FOR 1000 COMPLEX SAMPLES	< .3
OPERATIONAL DYNAMIC RANGE	76 dB (DERIVED)	83 dB
MAX. INPUT, @ 8% PER	-4 dBm	-4 dBm
SENSITIVITY	-80 dBm @ <8% PER	-87 dBm @ <5% PER
ACQUISITION	802.11 DSS AND FH	802.11 DSS AND FH
IMAGE REJECTION	>80 dB	>80 dB
LO RERADIATION	< -50 dBm	< -50 dBm
ADJACENT CHANNEL REJECTION	> 35 dB @ 30 MHz OFFSET PER <8%	> 35 dB @ 30 MHz OFFSET PER <5%
POWER	3.3, 5V 1.5W (RX MODE)	3.3, 5V, 700mW

**FIG. 268**



**FIG. 269**



**FIG. 270**

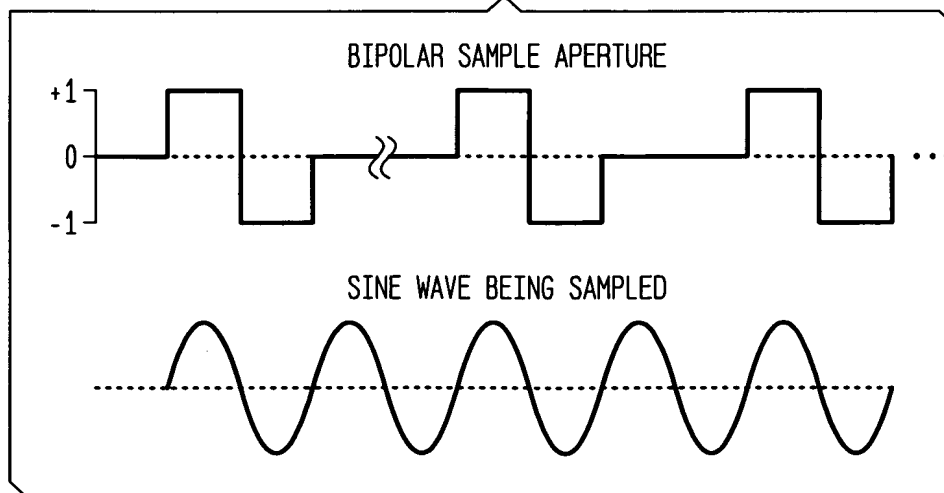


FIG. 271

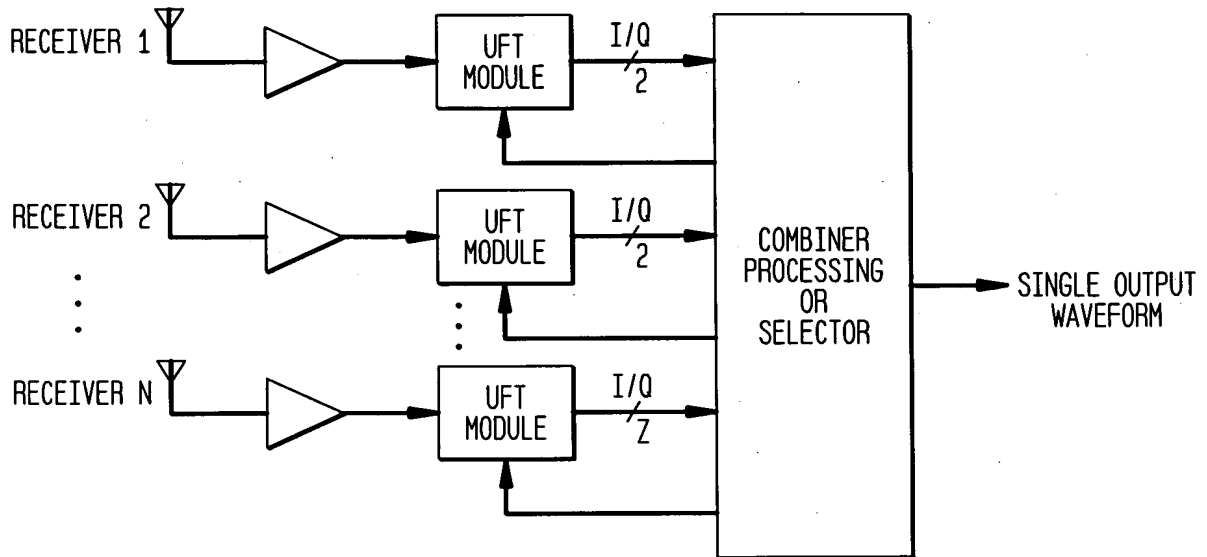


FIG. 272

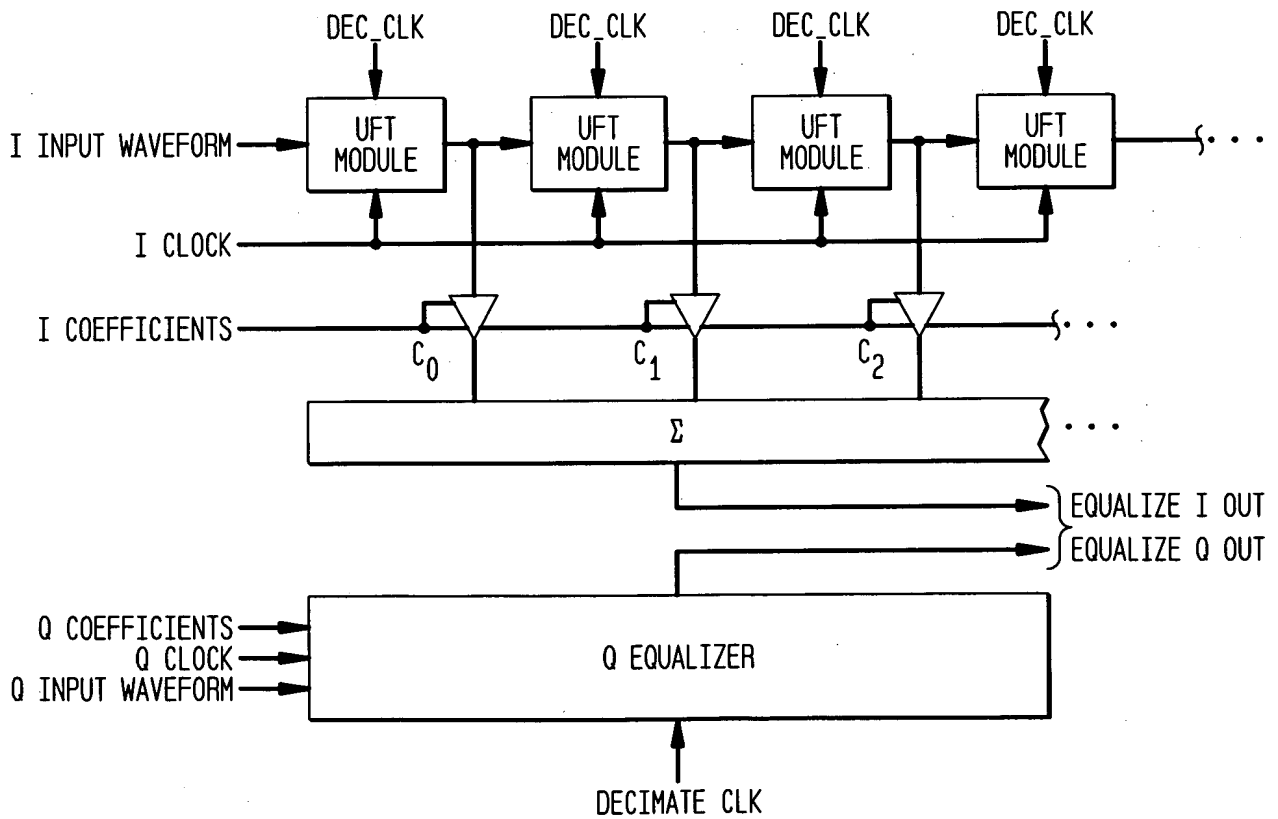


FIG. 273

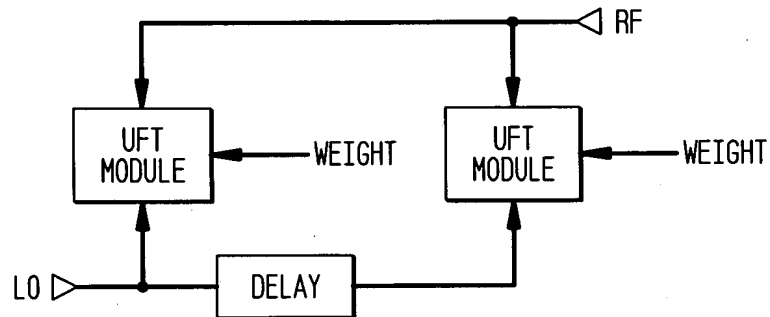


FIG. 274

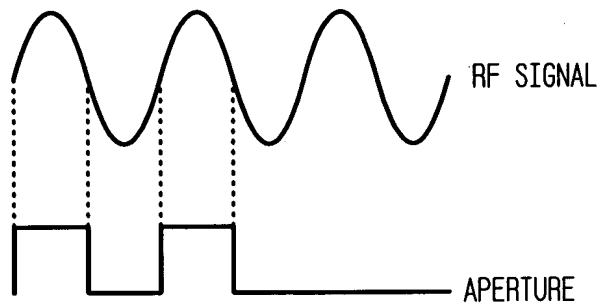


FIG. 275

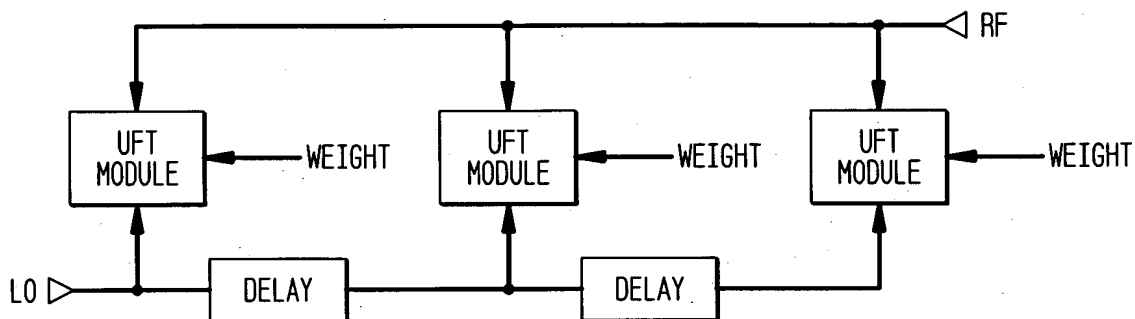


FIG. 276

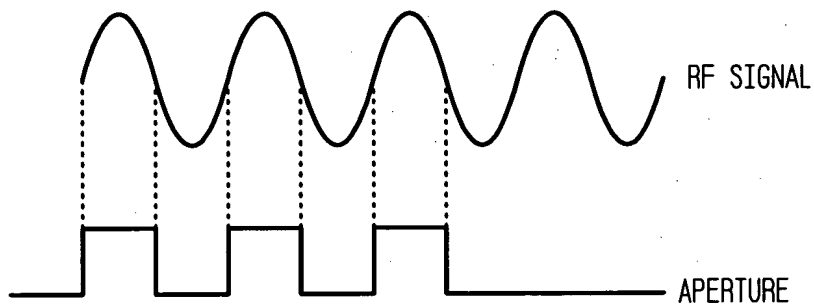


FIG. 277

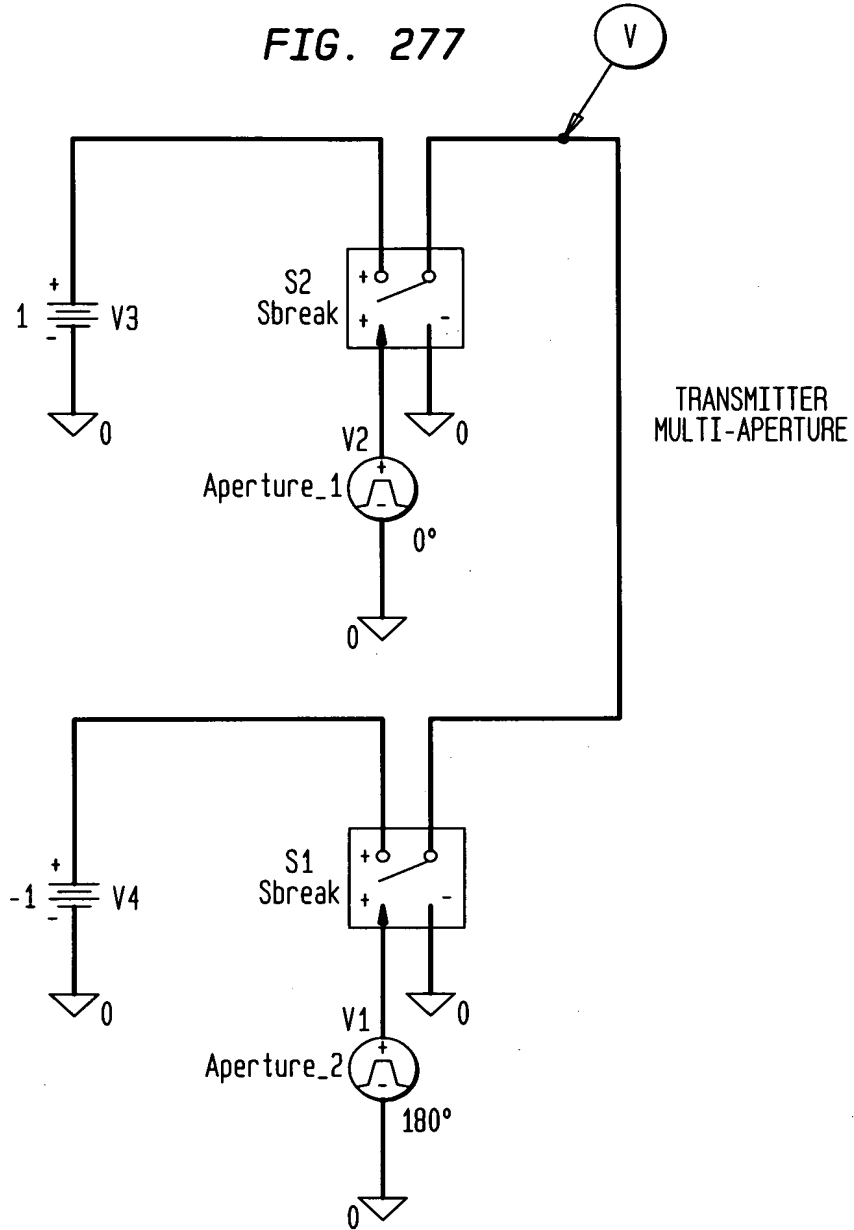


FIG. 278

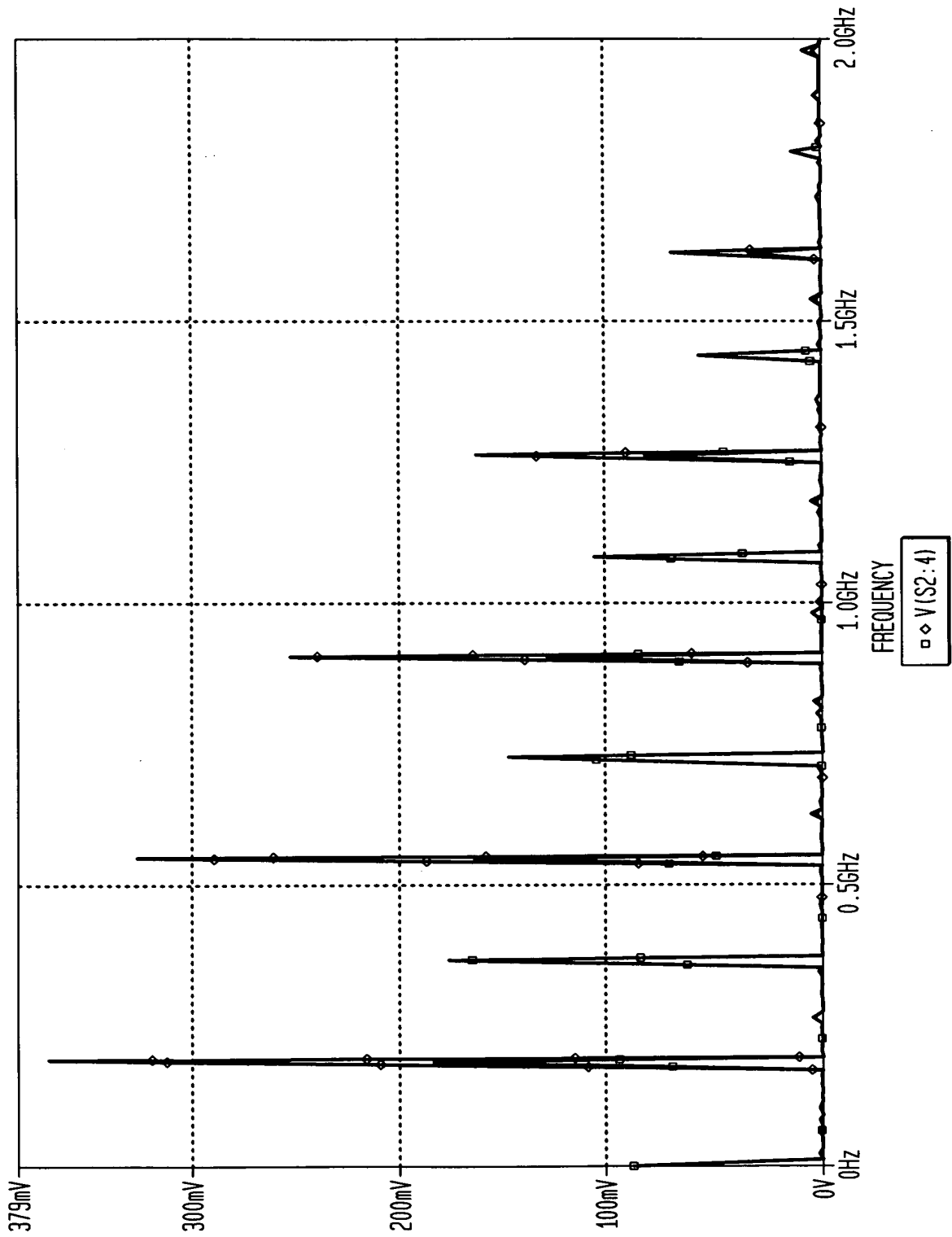


FIG. 279

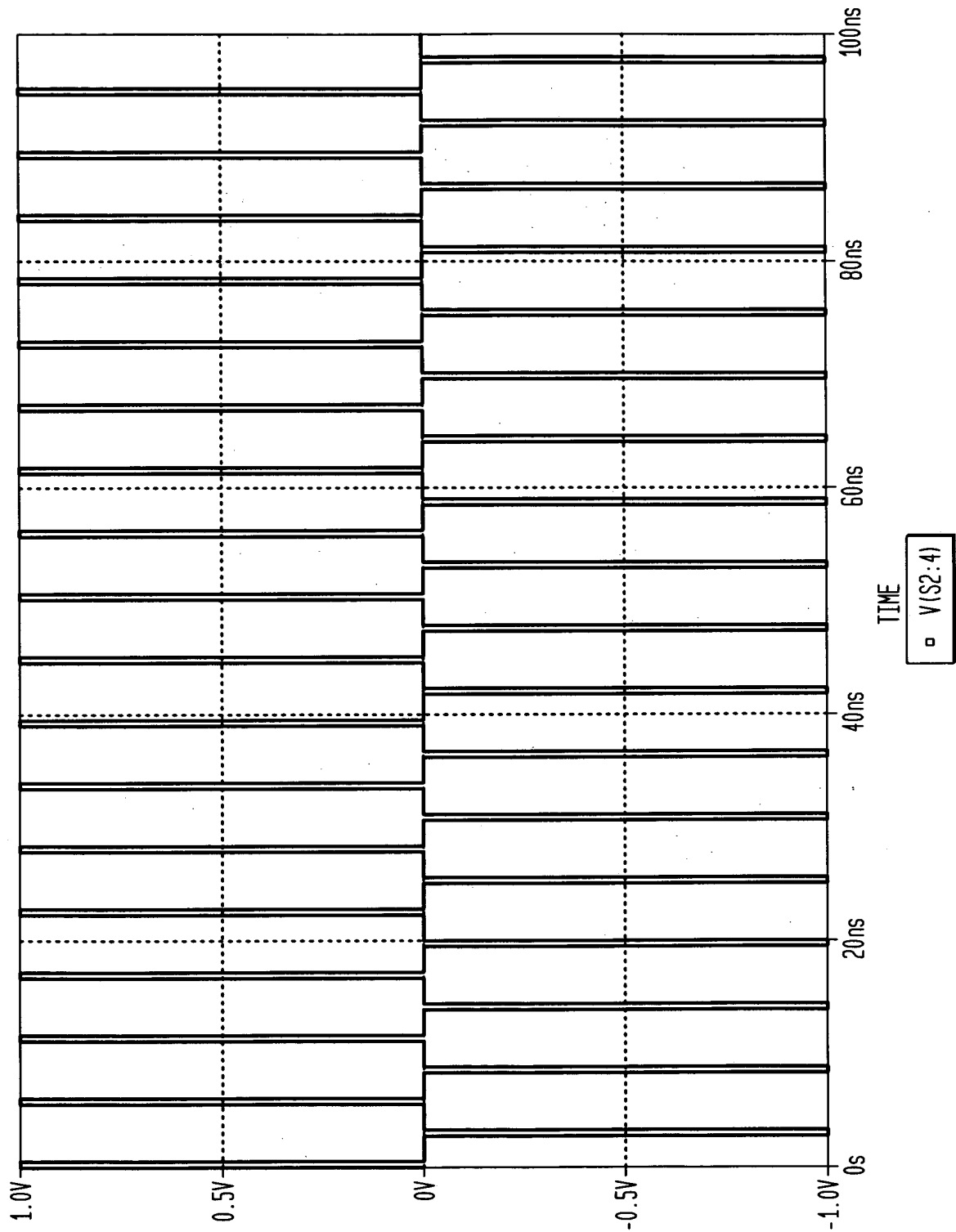
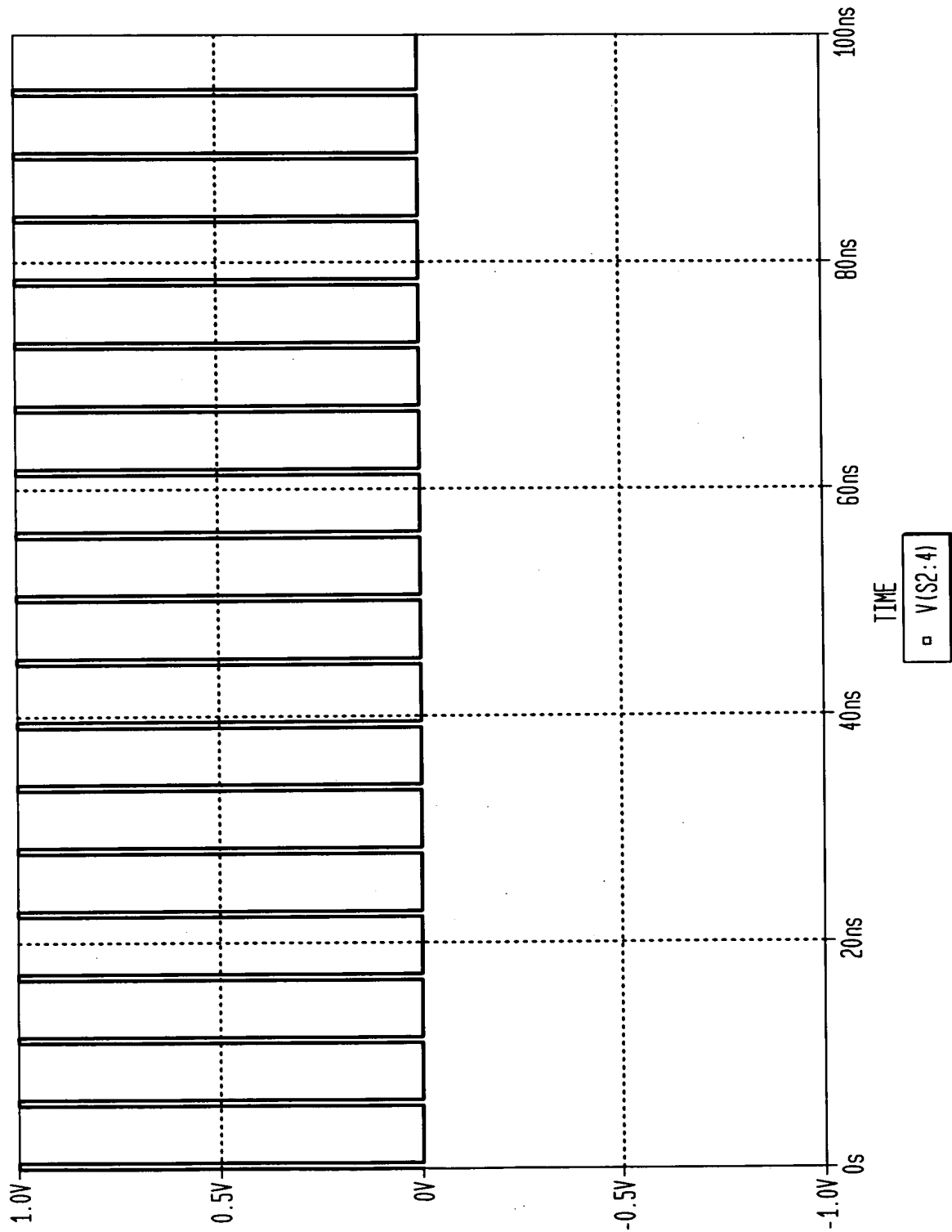


FIG. 280



**FIG. 281**

**MULTIPLE APERTURE RECEIVER IMPLEMENTATION**

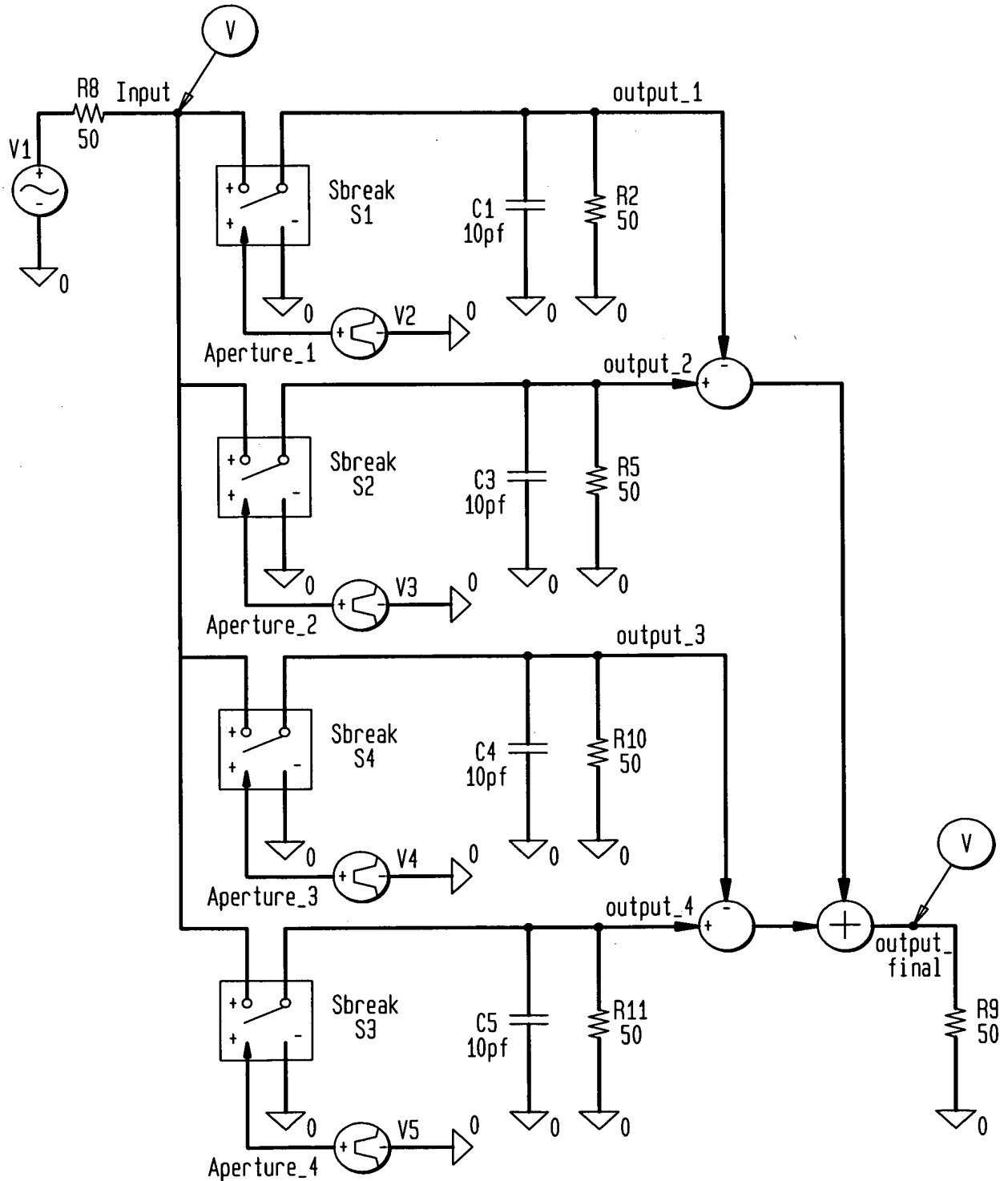
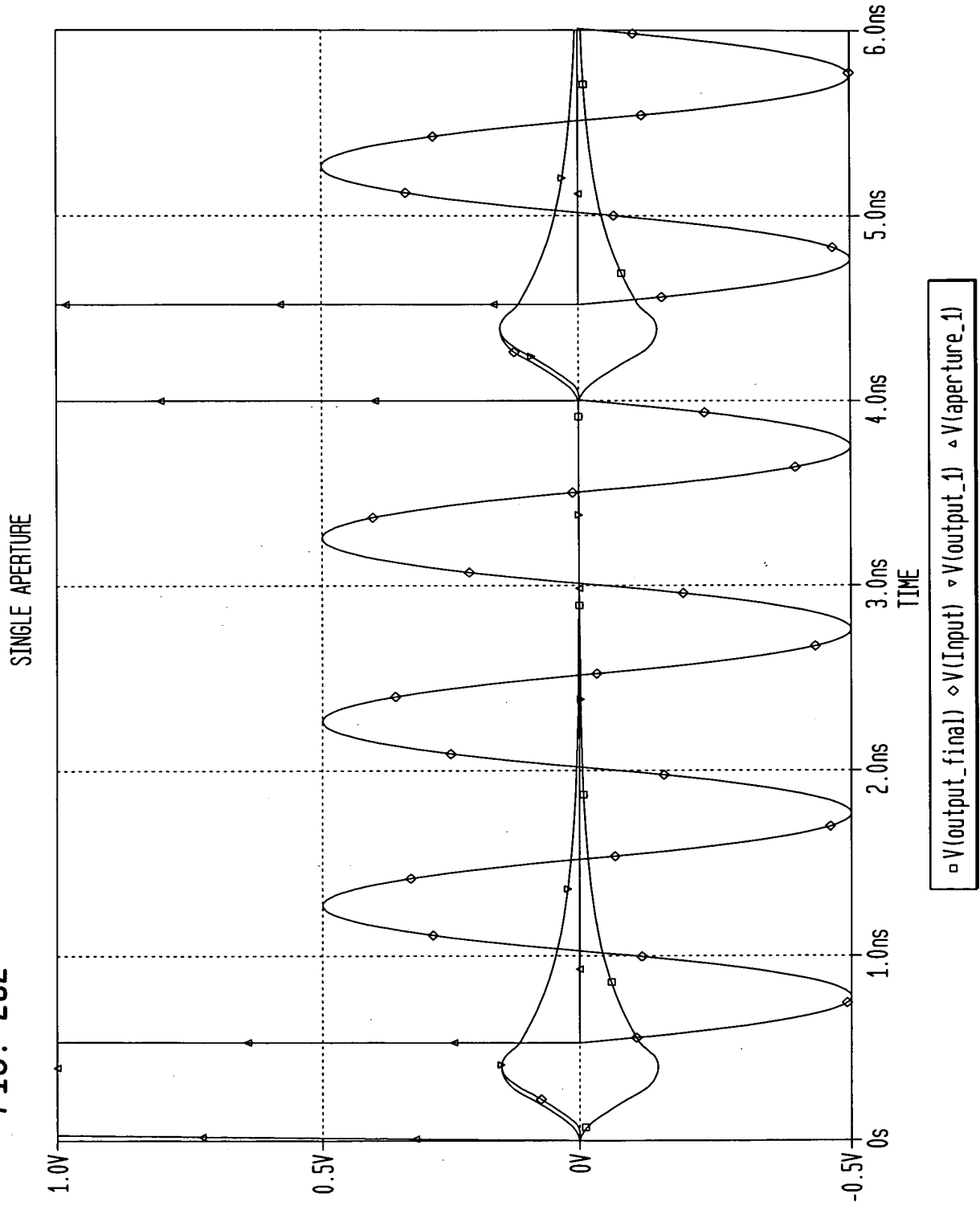


FIG. 282



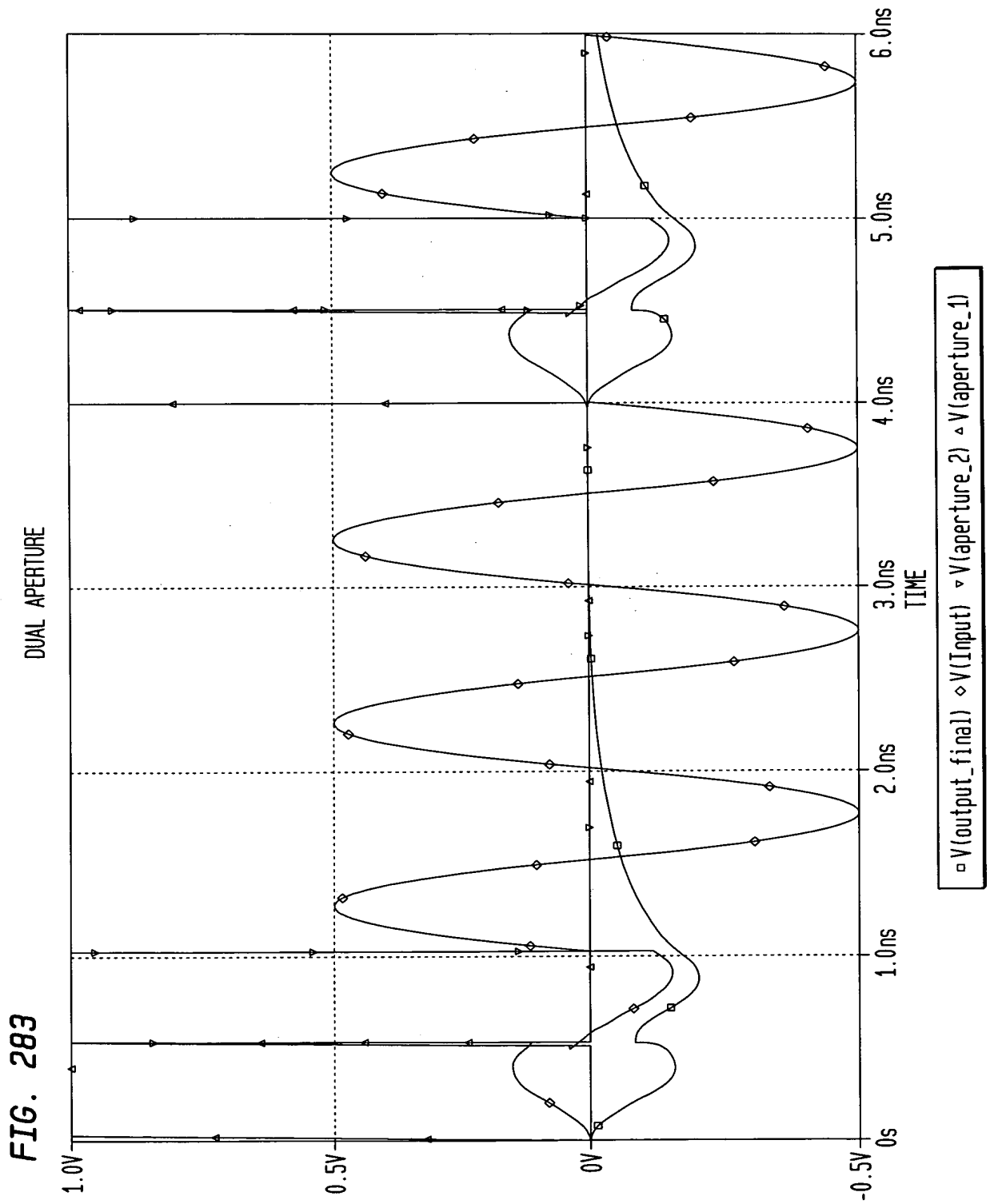


FIG. 284

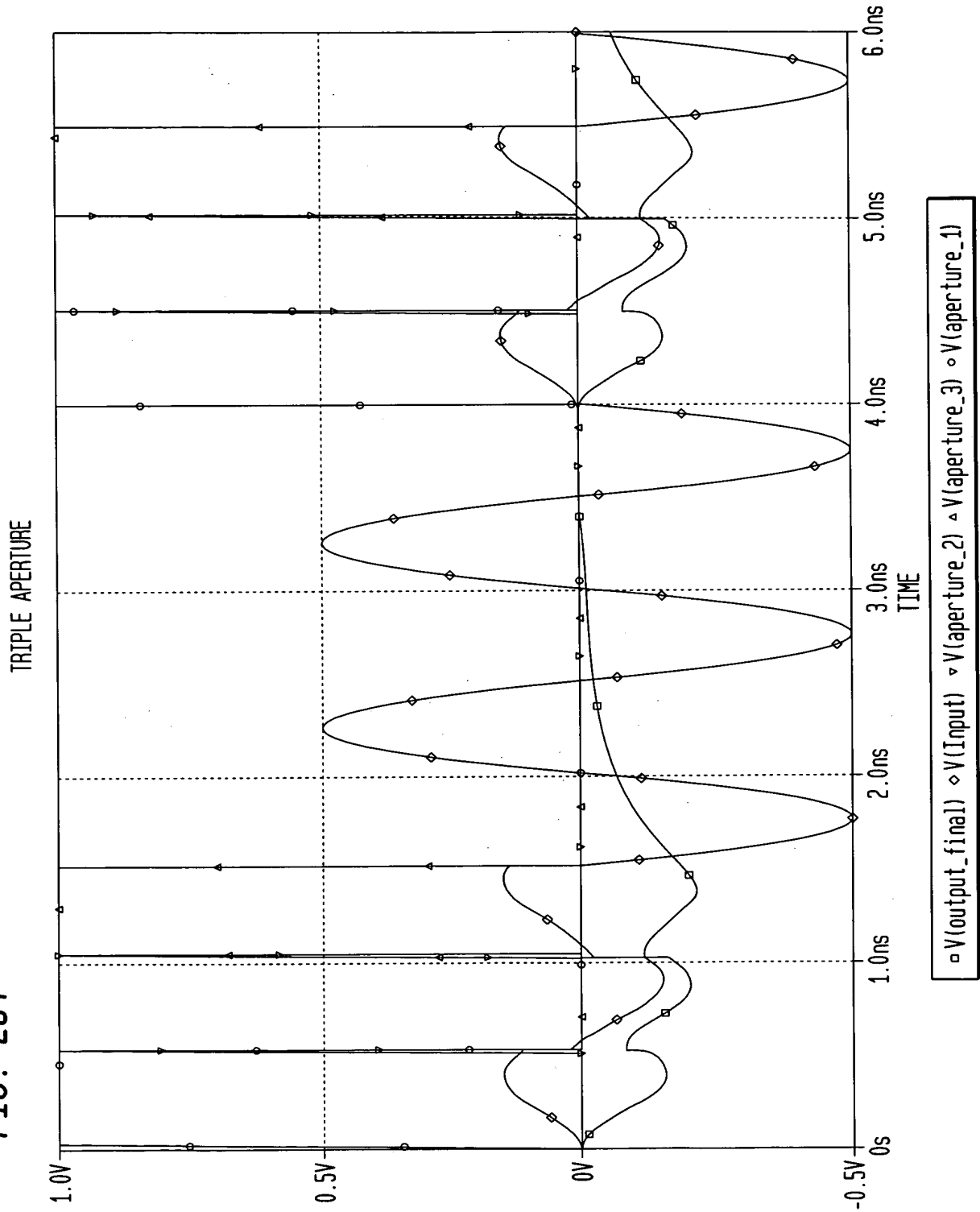


FIG. 285

